A STUDY OF THE COMMERCIAL HELICOPTER PASSENGER TRANSPORTATION INDUSTRY

Harold Wilson Guinn

A STUDY OF THE COMMERCIAL HELICOPTER PASSENGER TRANSPORTATION INDUSTRY

By

Harold Wilson Guinn, Jr.

Bachelor of Arts

Lycoming College, 1965

A Thesis Submitted to the School of Government and Business Administration of The George Washington University in Partial Fulfillment of the Requirements for the Degree of Master of Business Administration

June, 1971

Thesis directed by

James Rudolph Roman, Jr., D.B.A.

Assistant Professor of Business Administration

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

Figure

CHAPTER I

INTRODUCTION

Background

On July 6, 1939, Eastern Airlines began scheduled air mail service between two points using a rotary-wing type aircraft. This experiment which lasted approximately one year flew mail from the Camden Airport in New Jersey across the Delaware River to the rooftop of the Philadelphia Post Office. The aircraft was a Kellett KD-1B autogyro. It was not a pure rotary-wing craft as we know today's helicopters to be. It differed in that instead of achieving both lift and forward propulsion from the overhead rotor, the autogyro received its lift from the rotor while forward flight was provided solely by a propeller mounted forward on the fuselage revolving in a vertical plane. Nevertheless, this service became the first scheduled service utilizing rotary-wing aircraft.[1]

On April 15, 1941, Igor Sikorsky flew the first officially recorded rotor helicopter flight in the United States. The one hour and fifteen second experimental flight took place at Stratford, Connecticut (now the home of United Aircraft's Sikorsky Aircraft Division) in a Vought-Sikorsky VS-300A.[2] This aircraft was a pure helicopter. Although

---

[1]R. E. G. Davies, A History of the World's Airlines (London: Oxford University Press, 1964), p. 473.

[2]U.S., Civil Aeronautics Board (hereafter to be abbreviated CAB), "Milestones," Handbook of Airline Statistics 1969 (Washington, D.C.: Government Printing Office, 1969), p. 433.

underpowered compared to today's helicopter, it featured the familiar single main rotor overhead to provide lift, forward flight, and directional control; and a smaller tail rotor at the after end of the craft to counteract the main rotor's torque.

Both of these historical events made the public aware of the unique possibilities of commercial helicopter passenger service. However, further experimentation and the priorities of World War II delayed implementation of this new facet of air transportation.

The termination of the war brought many changes over the pre-war style of living. Among these changes were the technological developments of the aircraft industry that allowed safe, comfortable, and fast long-distance air travel. In addition to this change, the large production facilities that were used to build trucks and tanks were easily converted to the production of automobiles. And, finally, the pent-up consumer demand, stimulated by increased disposable income and liberal credit policies, resulted in the tremendous expansion of both of these industries. But the growth of these transportation segments soon resulted in a problem that set the stage for the birth of commercial helicopter passenger service.

It was noticed as early as 1949 that one of the most serious deterrents to air transportation was the time consuming surface travel between an airline passenger's origin and/or destination and the airport.[1] This was caused by the lack of convenient public transportation systems and the crowded conditions on the highways. Neither problem could be readily solved. To expedite the traffic flow between these

---

[1]Welch L. Pogue, "Helicopter's Air Power Role Misunderstood," Aviation Week, February 28, 1949, p. 22.

three points, air transportation seemed to be the only alternative, but obviously conventional fixed-wing aircraft could not be utilized on the downtown to outlying airport segment. And airport traffic area delays on certain short-distance airport to airport segments would cancel out the fixed-wing aircraft's speed.

The helicopter, although relatively slow and limited in carrying capacity and range when compared to conventional aircraft, had the one key advantage over fixed-wing aircraft that suited it for intra-city and airport flights--the ability to take off and land vertically, thus allowing flight operations from small, confined areas such as downtown heliports atop buildings and on small plots at ground level. Its relatively slow speed would be compensated for by its direct access and its own flight pattern in airport traffic areas that would free it from traffic control delays.[1]

With the helicopter's potential realized, the Civil Aeronautics Board--the economic regulator of the air transportation industry--began authorizing commercial helicopter passenger service in large, densely populated metropolitan areas of the country. The Board granted the Yellow Cab Company a three-year permit in 1947 to operate two routes: between the Cleveland Municipal Airport and a terminal point in downtown Cleveland, and between the airport and the suburb of Euclid, Ohio. This experiment in intra-city helicopter service was to utilize Sikorsky S-51 helicopters[2] and was authorized to carry only passengers and property.[3]

---

[1]Charles Gablehouse, Helicopters and Autogiros (New York: J. B. Lippincott Company, 1967), pp. 183-84.

[2]See Appendix for aircraft descriptions and specifications.

[3]Charles Adams, "Great Lakes Area Granted Helicopter Feeder Services," Aviation Week, September 15, 1947, p. 49.

However, the CAB eventually revoked the Yellow Cab certificate because of that company's failure to use it.[1] This was caused by the lack of a suitable helicopter to perform passenger service, and the absence of a mail authorization from the CAB that made it difficult to attract financing to launch the service.[2]

Another experiment in airport-city helicopter taxis was conducted by Skyways Corporation in Boston, Massachusetts, in 1947. Using three Sikorsky S-51 helicopters, the route was a three-mile flight from a downtown rooftop building to Logan International Airport. This service was discontinued because of an inability to achieve a profitable load factor[3] --a problem that was to plague commercial helicopter service operators for some time to come.

The first sustained commercial helicopter service was provided by a firm called Los Angeles Airways (LAA). Founded by a group of businessmen on May 11, 1944, the Civil Aeronautics Board granted the company a three-year temporary certificate on May 23, 1947, to carry mail and cargo. LAA became the first regularly scheduled helicopter service when it began operation on October 1, 1947.[4] Passenger service was begun on July 5, 1951, making LAA the first regularly scheduled helicopter airline.[5]

---

[1] "LAA Readies Passenger Copter Service," Aviation Week, July 23, 1951, p. 56.

[2] Selig Altschul, "CAB Faces Helicopter Problem," Aviation Week, January 9, 1950, p. 35.

[3] "How to Cut Ground Travel Time," Aviation Week, July 4, 1949, p. 43.

[4] Davies, World's Airlines, p. 474.

[5] CAB, "Major CAB Actions," Handbook 1969, p. 462.

Since that time three more large scale helicopter airlines were formed--New York Airways (NYA), Chicago Helicopter Airways (CHA), and San Francisco-Oakland Helicopter Airlines (SFO). Los Angeles Airways, plus these three, established the standard in commercial helicopter passenger service. Therefore, it was the responsibility of these four companies to prove that helicopters could provide convenient and economically sound service in the intra-city and city-to-airport markets.

Statement of the Research Question

The main research question of this thesis is "How have the four certified operational commercial helicopter passenger companies performed since their founding?

The subsidiary questions leading to the answer of the main research question are:

1. How have the four helicopter companies developed since their inception?

2. What has been the economic performance of the companies, individually and as a group?.

3. What role has the Civil Aeronautics Board played in scheduled commercial helicopter service?

4. What role have the commercial airlines played in scheduled commercial helicopter service?

Scope of the Study

This study will briefly describe the evolution of helicopter transportation from its beginning until 1970, with a focus on the four major helicopter airlines: Los Angeles Airways, New York Airways, Chicago Helicopter Airways, and San Francisco-Oakland Helicopter

Airlines. The descriptions will emphasize the chronological highlights in each airline's development rather than the details of operation. In addition, pertinent information such as routes, types of aircraft utilized, fares, and heliport availability will be included. This overview will give the reader some idea of the makeup of helicopter operations.

The economics of this portion of the transportation system are limited to those aspects of helicopter operations that will provide sufficient information for the reader to evaluate the helicopter's performance. Again, details felt to be interesting but not essential to understanding have been eliminated.

Two of the most influential segments of the federal government in the development of the commercial helicopter airlines have been the Civil Aeronautics Board and the Congress. Consequently, discussion will be restricted to these two segments. However, mention of other departments of the government, such as the military, will be noted when applicable.

Method of Analysis and the Research Methods Utilized

It will be noted in the next section of this chapter that the subsidiary questions have been arranged in an order that will facilitate the answering of the main research question. Each chapter is a reflection of a subsidiary question. Each subsidiary question will provide more information upon which a valid conclusion can be stated in the end.

Information for this study was obtained from secondary sources using 5 x 8 cards. Reproduced copies of the source were used when the needed data was so voluminous that copying by hand would have been impractical. Primary sources were utilized initially, but it was soon discovered that information being given by those sources was identical

to that found in the secondary sources. In that light, it was felt that time and energy could be saved without any loss of validity by forgoing interviews and correspondence.

The locations of these secondary sources were the Civil Aeronautics Board (CAB), the Naval Air Systems Command of the Department of the Navy, the District of Columbia and the Fairfax County libraries. The first two libraries just mentioned were of primary importance. The CAB provided the statistical data pertaining to the four companies' operations while the Naval Air Systems Command library provided information on their history through periodicals dated back to the commencement of operations. The specific sources of information were government publications, periodicals, books relating to air transportation, and trade publications.

Organization of the Study

Chapter Two will provide an historical perspective of the helicopter manufacturing industry and the four helicopter operators. It will trace the development of each from the beginning to the present. Highlights and significant aspects in their growth will be noted, along with a description of the airline in terms of route structure, fares, heliports, and the type of helicopters utilized.

Chapter Three will examine the techniques that are used in evaluating the economic performance of an airline. In that discussion, salient points concerning helicopter operations will be brought out and a comparison among the operators' performance will be made.

Chapter Four will be concerned with the role that the Civil Aeronautics Board played in the helicopter airlines' development and growth.

Chapter Six will establish pertinent conclusions based on information provided in the previous chapters and recommendations based on the conclusions.

CHAPTER II

HISTORICAL DEVELOPMENT

The Industry

It is essential that some discussion of commercial helicopter passenger service be first devoted to the helicopter manufacturing industry. By doing so, a better understanding of some of the difficulties encountered by this unique service will be provided.

As has been the case in most aviation developments, the pressures of hot and cold wars stimulated all aspects of helicopter progress. World War II prompted further experimentation in vertical take-off and landing aircraft following Igor Sikorsky's VS-300 flight in 1941. Another pioneer in this field, Frank Piasecki, later built and flew the second successful United States helicopter in 1943,[1] although his aircraft did not participate in the war. Only three helicopter types were ordered in quantity during the war, and all were built by Sikorsky. They were 130 R-4's, sixty-five R-5's, and 200 R-6's.[2] These aircraft were very much like the original VS-300 except that the cockpit was enclosed and space was provided for two passengers. The Army, Navy, and Coast Guard restricted these models to light emergency transport and

---

[1]Philip Siekman, "The Big New Whirl in Helicopters," Fortune, April, 1966, p. 127.

[2]Alexander McSurely, "Helicopter Industry Gets First Big Orders," Aviation Week, October 9, 1950, p. 12.

rescue,[1] because of their small size and limited lifting capacity due to their underpowered reciprocating engines. On January 3, 1944, the first helicopter mission of mercy was performed by a Coast Guard R-4. This helicopter carried blood plasma from New York City to the destroyer USS Turner, which had suffered an explosion off of Sand Hook, New Jersey, incurring over 100 casualties.[2] The first combat aircrew helicopter rescue took place in Burma in April, 1944. An Army R-4 lifted three injured liaison airplane aircrewmen from the jungle behind enemy lines. The state of technological development of the helicopter at this time is revealed when you consider that this R-4 was required to make three trips to rescue each crewman. This was necessitated by the high altitude and high temperatures aggravating an already limited "power-available" engine.[3]

With the advent of atomic weapons, the military realized the danger of massing their military forces in a central location. In the future, tactical forces would have to be dispersed to prevent total annihilation by a single weapon. The dispersion, however, prompted the requirement of increased mobility--a requirement that the Marine Corps found could be met by the helicopter. In 1947 they established the first experimental helicopter squadron to test the new combat technique of vertical assaults to complement their World War II-proven amphibious assaults.[4] Encouraged by this development and by Air Force requirements

---

[1]Ben S. Lee, ed., 1959 Aviation Facts and Figures, Aviation Industries Association of America, Inc. (Washington, D.C.: Lincoln Press, Inc., 1959), p. 79.

[2]"Famous Firsts," 1970 Sikorsky Aircraft Calendar.

[3]Ibid.

[4]Lee, 1959 Aviation Facts and Figures, p. 79.

for rescue aircraft, the helicopter manufacturing industry produced 387 aircraft to meet the military's needs from 1946 to 1950.[1]

But for all the technological developments of the helicopter in the postwar period, the rotorcraft was still considered more of a ". . . potential force than a present factor . . ." and ". . . at the present stage of evolution the helicopter had now reached essentially the same point of development which fixed-wing aircraft had reached at the outbreak of World War I . . ."[2] The problems of greater load carrying capacity, longer range, and improved performance were still troubling its progress; and the price of a helicopter was rising, rather than falling, due to increasing design complexity, and labor and material costs. And this was in spite of growing military procurement and commercial sales.[3]

Commercial sales of helicopters following the war consisted of only small types, usually a converted military model, seating from two to five persons. These models were about the size of Sikorsky's S-51 which became the first helicopter to be licensed by the Civil Aeronautics Board for commercial operations. The S-51 entered production in 1946.[4] In the postwar period from 1946 to 1950, the great majority of these aircraft in the commercial field were being used for agricultural

---

[1]Gerald J. McAllister, ed., 1970 Aerospace Facts and Figures, Aerospace Industries Association of America, Inc. (New York: McGraw-Hill Book Company, 1970), p. 34.

[2]Albert E. Smyser, "Helicopter's Air Power Implications," Aviation Week, February 23, 1948, p. 39.

[3]Robert McLarren, "Helicopter Progress is Revealed," Aviation Week, May 3, 1948, p. 13.

[4]Leonard Bridgman, ed., Jane's All The World's Aircraft 1949-1950 (New York: The McGraw-Hill Book Company, 1949), p. 277c.

purposes such as crop dusting and spraying for disease control, aerial and geological surveying, mapping, power line patrols, off-shore drilling service, prospecting, rescue, and police purposes.[1] The commercial flying of passengers on a scheduled basis was authorized during this period for some carriers, but the CAB withheld such authority for LAA, CHA, and NYA because of the experimental nature of rotary-wing aircraft. and the very limited carrying capacity. But mail service on a regular pattern was begun.

It wasn't long, therefore, before commercial operators began demanding larger vertical-lift aircraft to carry larger loads of mail and cargo, and passengers to increase their revenue. The three giants of the helicopter production industry at that time--Bell, Piasecki, and Sikorsky--announced their willingness to provide commercial versions of their craft, which were military oriented. Only Piasecki had a model large enough to carry ten passengers, but this was not available to commercial operators.[2] However, the limiting factor in the development of these larger commercial versions were the armed forces, whose permission to produce such aircraft was necessary beforehand. In addition, some aviation experts thought that the chances were slim that any of the manufacturers could stand the costly tooling expense unless they received substantial orders for the large models from the military to overshadow the price penalty caused by low production.[3]

---

[1]Pogue, "Helicopter's Role Misunderstood," p. 22.

[2]Smyser, "Helicopter's Implications," p. 39.

[3]Stanley L. Colbert, "Transport Helicopters Revealed," Aviation Week, November 7, 1949, p. 42.

The Korean War provided those substantial orders needed to employ the economies of scale in helicopter production. The years 1951 and 1952 found a respective total of 360 and 983 helicopters produced for the military--a combined total that exceeded the number of units produced from 1941 to 1950 by sixty percent![1] The vast majority of commercial operators did not benefit immediately from this expanded production. The war's demands for rotary-wing aircraft limited the supply and postponed the acquisition of the newer and larger helicopter cargo versions.[2] However, those commercial helicopter airlines operating on a schedule were authorized by the military to purchase a few of these new, larger capacity helicopters. This was prompted by the manufacturers' and military's need for operational data on its helicopters. Paradoxically, even though the military was the largest user of helicopters, their low utilization rate at that time forced a dependence on the helicopter airlines for such information because their utilization rate was high. For example, in 1962, the military was fortunate if they utilized their helicopters an average of three hours per day while Chicago Helicopter Airways was using their equipment ten hours per day on the average.[3]

Sikorsky's S-55, a seven-passenger commercial version of the military's H-19, was the airline's answer to the replacement of the S-51. Developed during the Korean War, the S-55 was first used in airline traffic by New York Airways on October 15, 1952, to carry mail

---

[1]McAllister, 1970 Aerospace Facts and Figures, p. 34.

[2]McSurely, "First Big Orders," Aviation Week, pp. 12-13.

[3]David A. Anderton, "Military Sparks Helicopter Growth Revival," Aviation Week, March 12, 1962, pp. 247-48.

initially, and then passengers the following summer. The S-55 became the first helicopter approved for commercial passenger operations.[1]

The termination of the Korean War found helicopter development at the 1920 stage of fixed-wing aircraft configuration.[2] After eight years of commercial operations, complaints of high costs of purchase and operation were voiced. The American Helicopter Society urged that an ". . . engineer designing a transport helicopter should not be content with just producing a machine of the best possible speed or payload or range; but, instead, one that is capable of getting the highest possible profit for the commercial operator."[3] Operators expressed the feeling that the helicopter industry had failed to work on the basic problems of the lack of large transport-type vehicles, the complexity and attendant high initial and operating costs, and the lack of all-weather capability. They felt that the major problem of that industry to meet the demand for efficient and economical machines was due to the multiplicity of projects and development loads it had accumulated under government contracts for the military.[4] The Air Transport Association demanded that the industry design a helicopter specifically for airline use, rather than a military-oriented design.[5]

---

[1]CAB, "New Aircraft Types," Handbook 1969, p. 488.

[2]Irving Stone, "Military Copter Success Spurs Civil Use," Aviation Week, March 15, 1954, p. 143.

[3]Claude O. Witze, "Helicopter Builders Grapple With Costs," Aviation Week, July 5, 1954, p. 13.

[4]"Volume of Complaints Measures Need for Helicopters," Aviation Week, February 25, 1957, p. 262.

[5]Claude O. Witze, "Airlines Demand 'Practical' Helicopters," Aviation Week, September 3, 1956, p. 39.

Another often-voiced demand was that multi-engine aircraft be produced. It was realized early by the commercial helicopter airline operators that if safe flight operations in the center of congested metropolitan areas were to be initiated, more than one engine would be required. The unique ability of a helicopter to autorotate or make a controlled, unpowered glide to a landing would be precluded by high buildings, traffic and pedestrians. The only alternative would be the addition of another engine to back up a failed engine so that a stricken craft could continue powered flight.[1]

To meet these demands in some part, efforts to adapt the long-established gas turbine to helicopters were begun in 1954.[2] The major advantages to be realized in this adaptation were:

1. Increased power.
2. Increased fuel economy.
3. Increased durability.
4. Increased reliability.
5. Lower noise level.
6. Reduced vibration level.
7. Reduced maintenance costs.[3]

The Sikorsky S-58 and the Boeing-Vertol (formerly known as Piasecki) V-44 helicopters were put into service in 1956 and 1958,

---

[1]"Backs Copters for Inter-city Hauls," Aviation Week, May 8, 1950, p. 43.

[2]L. J. Nutall, "Gas Turbine Improves Performance," Aviation Week, June 27, 1955, pp. 28-33.

[3]"GE Says Turbines Best for Copters," Aviation Week, November 22, 1954, p. 20.

respectively, to provide more carrying capacity.[1] Both aircraft were considered interim models for commercial operators because of their single-engine limitation.[2] The primary goal was acquisition of Sikorsky's and Vertol's planned twin-engine turbine models. Without the increased power of the turbine-powered craft, problems such as experienced with New York Airways' V-44 would continue. Such a large aircraft powered by a reciprocating engine was suitable in ideal weather conditions, but was handicapped by high humidity and high temperatures. Such atmospheric conditions required that passenger loads be cut from fifteen to eleven,[3] thus reducing revenues per trip and increasing costs because of the unscheduled trips to transport those passengers originally left behind. In addition, the single engine limitation still was hampering instrument flight at night and in inclement weather.[4]

1960 marked the transition year from piston-powered to turbine-powered helicopters. The industry suffered decreased sales in 1959 because of the commercial operators' anticipation of this transition, and the contraction of government spending for military weapons.[5] Despite the growing number of commercial helicopters and helicopter operators,[6] military development funds and production quantities still

---

[1]CAB, "New Aircraft," Handbook 1969, p. 488.

[2]"Helicopter Design Lags Behind Needs," Aviation Week, March 12, 1956, pp. 258-65; Glenn Garrison, "NY Airways Studies Turbine Conversion," Aviation Week, December 8, 1958, p. 47.

[3]Garrison, "NY Airways Studies," p. 47.

[4]Ibid.

[5]Robert I. Stanfield, "Helicopter Market Meets Transition Lull," Aviation Week, March 9, 1959, p. 231.

[6]McAllister, 1970 Aerospace Facts and Figures, p. 125.

governed commercial helicopter development.[1] In addition, the military tendency at this time was to reduce the variety of helicopters in their inventory, thus decreasing the commercial operator's chances of eventually finding a craft to suit their specific purposes.[2]

Sikorsky brought out the first turbine-powered helicopter in 1960. Called the S-62, it was a single-engine, eight to eleven passenger model designed as an interim aircraft until the twin-engine turbine S-61 by Sikorsky was ready for marketing. Los Angeles Airways utilized the S-62 as a familiarization vehicle for its pilots while simultaneously evaluating passenger service operations.[3]

In quick succession, the Sikorsky S-61 was placed into commercial helicopter airline service in March, 1962;[4] and Boeing-Vertol's twin-engine, tandem rotor helicopter, the V-107, went operational in July, 1962.[5] The commercial operator's solution to rising operational costs and the desire for increased safety had long-last been realized, it was believed. It did not matter that these aircraft were outgrowths of the Navy's famed antisubmarine warfare helicopter, the SH-3; or the Marines' troop-carrying CH-46, respectively. The operators felt that their business would be profitable from this time on, unaware that in the next six years circumstances such as increased costs due to twin-turbine

---

[1]"Changing Concepts Set Helicopter Pace," Aviation Week, March 7, 1960, p. 247.

[2]Ibid.

[3]U.S., Congress, Senate, Committee on Commerce, Helicopter Air Service Program, Hearings before the Aviation Subcommittee, Senate, 89th Cong., 1st sess., 1965, p. 148.

[4]CAB, "New Aircraft," Handbook 1969, p. 489.

[5]Ibid., p. 490.

introduction, subsidy curtailment, fatal accidents, and periodic unprofitable trunk airline business would adversely affect that goal.

Initially buoyed by the turbine introduction, the helicopter industry picked up more impetus from government contracts as a result of the United States' involvement in Vietnam. Confronted by a guerilla insurgency that required extreme mobility to counter, the only effective weapon was the helicopter. At no other time in rotary-wing history were the capabilities and limitations of the helicopter revealed and studied more than in the Vietnam War. United States helicopter production grew by approximately 800% between 1960 and 1967, when deliveries from mid-1965 orders for the Vietnam buildup peaked at about sixteen million pounds (see Figure 2).[1]

The commercial helicopter airline operators did not directly benefit by this increased production. Those carriers utilizing the S-61 did not benefit because that model aircraft was not used in combat. New York Airways' V-107 did have a counterpart in Vietnam in the Marines' CH-46, but many of the bugs in the aircraft were resolved by that airline prior to the Marines using it in Vietnam.[2] However, the increased production did provide increased earnings to the helicopter industry to undertake limited research and development in future machines and to spread the cost of producing commercial airline helicopters.

Today, the helicopter industry is on perilous ground. All the helicopters presently in service with the military and the commercial

---

[1]Ben Schemmer, "Helicopter Industry Faces Potentially Fatal Squeeze," Armed Forces Journal, June 13, 1970, p. 14.

[2]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 192.

operators were developed prior to 1965. But since that year, the industry's engineering capability has been supported by a single military Research and Development program--the Lockheed/Army AH-56 "Cheyenne" (see Figure 1). For over five years, therefore, technical developments in the industry as a whole have been dependent on production or product improvement contracts, which now are heading for a ten-year low (see Figure 2).[1] Because of the steady withdrawals from Vietnam, Defense Department production and research cutbacks have placed the helicopter industry in a unique position. Current production runs will soon cease and future production of newly designed helicopters are beyond 1973. Hence a "helicopter development gap" has been established.[2]

1950	1953	1957	1960	1962	1965		1971
		H-43				Helicopter Development Gap	
		DASH					
		H-52					
		H-46 (V-107)		H-6			
		H-47		H-53			
		H-3 (S-61)					
	H-1	H-2		H-54	H-56		

Fig. 1.--Helicopter Development

Source: Ben Schemmer, "Helicopter Industry Faces Potentially Fatal Squeeze," Armed Forces Journal, June 13, 1970, p. 14.

---

[1]Schemmer, "Helicopter Industry Squeeze," Armed Forces Journal, p. 14.

[2]Ibid.

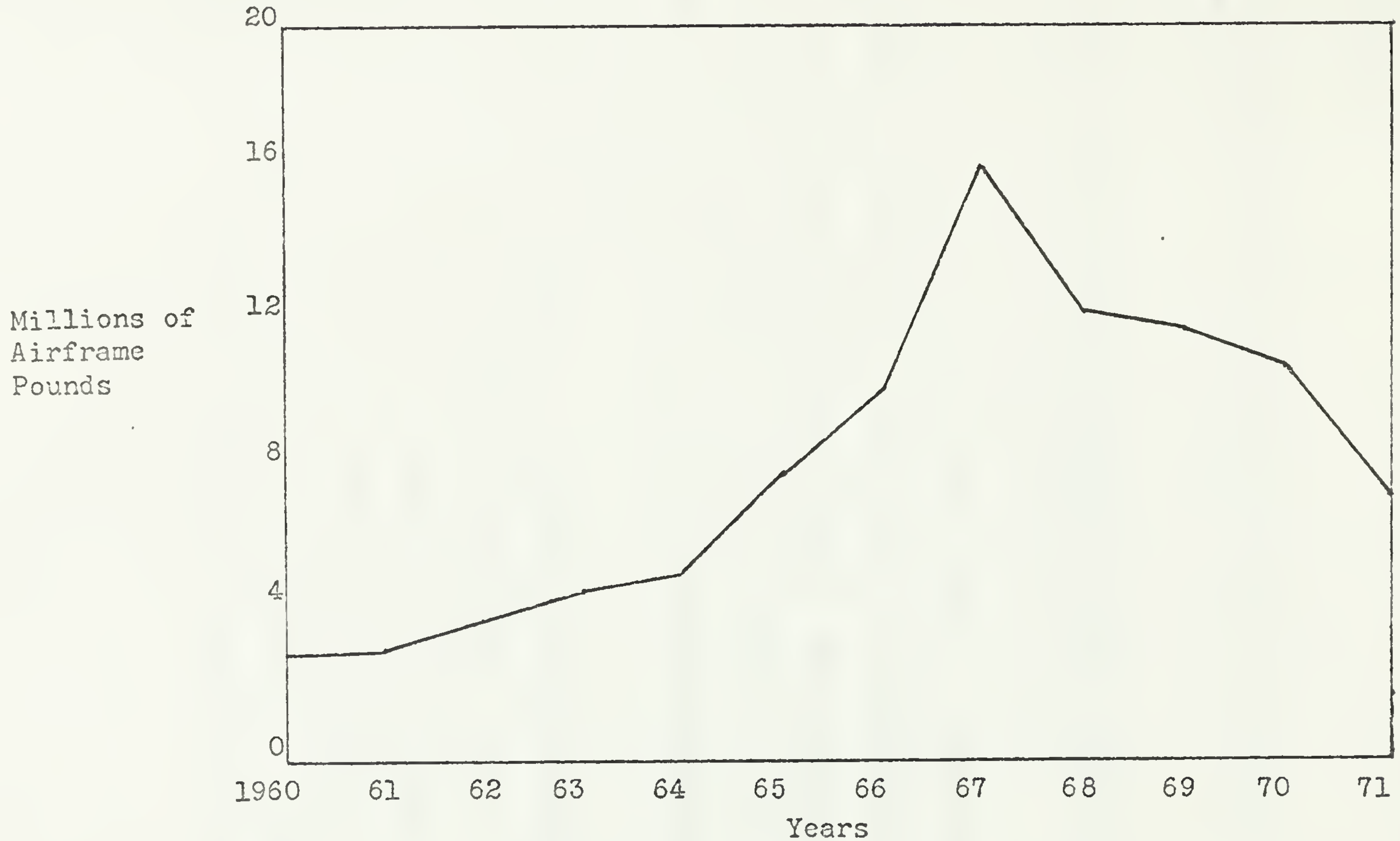

Fig. 2.--Helicopter Industry Airframe Pounds-Production

Source: Armed Forces Journal, June 13, 1970, p. 15.

The Armed Forces Journal states the implications of this situation:

> 1. There isn't enough production business in sight to let firms like Boeing-Vertol, Bell, Kaman, Sikorsky, and Hughes Tool Company to keep their helicopter design teams intact through production-funded improvement, or independent research and development programs.
>
> 2. Nor do the firms have the business base needed to weather with company funds the drought which faces them in research and development funding.
>
> 3. Given currently planned Department of Defense helicopter orders, it's unlikely that enough helicopter firms will survive for Department of Defense to have meaningful competition on its downstream programs.
>
> 4. Commercial utilization hasn't expanded enough to provide a production base adequate for the industry to survive, much less develop its ideas for efficient second-generation turbine equipment.[1]

Table 1 gives an indication of the total number of helicopters produced by the industry since 1953. In addition, the relationship between commercial and military production is shown. This clearly shows that the military dominates the market. Out of the total of 19,029 helicopters produced from 1953 to 1967, 13,796 or seventy-three percent were purchased by the military.

Table 2 reveals the percentage of helicopter airline aircraft produced from the total number of commercial helicopters. It is apparent that there was not a substantial market for airline-type helicopters (except for four years in the 1950's) that warranted the industry to design an aircraft specifically for airline use. A bigger market was available to the helicopter industry in utility and business

---

[1]Ibid.

TABLE 1

PRODUCTION OF HELICOPTERS
Total, Commercial and Military
Calendar Years 1953 to 1969

Year	Total	Commercial[a]	Military
1953	1054	111	943
1954	562	131	431
1955	590	146	444
1956	915	268	647
1957	1003	314	689
1958	908	240	668
1959	704	253	451
1960	760	266	494
1961	744	378	366
1962	1031	407	624
1963	1266	504	762
1964	1678	579	1099
1965	2086	598	1488
1966	2825	583	2242
1967	2903	455	2448
1968	-	522	-[b]
1969	-	534	-[c]

[a]The commercial helicopter category is composed of all helicopters used for public transportation, business, and utility.

[b,c]Not available. However, Department of Defense funded production of 2,685 helicopters in Fiscal Year 1968; 2,304 in Fiscal Year 1969; 1,225 in Fiscal Year 1970; and 1,009 in Fiscal Year 1971. (See Schemmer, "Helicopter Industry Squeeze," Armed Forces Journal, p. 14.)

Sources: Lee, ed., 1959 Aviation Facts and Figures, p. 106; McAllister, ed., 1970 Aerospace Facts and Figures, p. 36.

TABLE 2

PRODUCTION OF AIRLINE HELICOPTERS AS A PERCENTAGE OF COMMERCIAL PRODUCTION CALENDAR YEARS 1953 to 1969

Year	Airline[a]	Commercial[b]	Percentage
1953	18	111	16
1954	43	131	33
1955	46	146	31
1956	107	268	40
1957	98	314	31
1958	45	240	19
1959	55	253	22
1960	17	266	7
1961	14	378	4
1962	19	407	5
1963	32	504	6
1964	42	579	7
1965	46	598	8
1966	41	583	7
1967	14	455	3
1968	9	522	2
1969	20	534	4

[a]The airline category includes only those helicopters capable of providing mass public transportation. These are: the Boeing-Vertol V-44 and V-107, and the Sikorsky S-55, S-58, S-62, and S-61.

[b]The commercial category is composed of all helicopters used for public transportation, business, and utility.

Sources: Lee, ed., 1959 Aviation Facts and Figures, p. 106; McAllister, ed., 1970 Aerospace Facts and Figures, p. 35.

type helicopters that were small, light, and relatively inexpensive to purchase.[1]

The helicopter manufacturing industry clearly lacked the incentive to become fully committed to the production of large commercial helicopters. The armed forces were the biggest buyers of helicopters as was pointed out in the preceding discussion, and, naturally, it followed that the industry catered to the military's needs. It was estimated that from 1943 to 1963 ninety percent of the dollar volume of the helicopter manufacturing industry was attributed to military purchases,[2] and judging from Table 1 this figure has probably remained constant if not increased.

Consequently, the helicopter airlines were dependent on commercial versions of military helicopters throughout their history. The initial enthusiasm of commercial helicopter service following World War II was dampened by the lack of suitable equipment and the military requirements of the Korean War. The helicopter airlines compiled operational data on the use of military helicopters during the Korean War, and they discovered that the costs were high.

In the following section on the helicopter airline industry, it will be noted that only five helicopter airline companies were certified by the CAB. By the mid-1950's the realization that economic helicopter operations would not materialize until the equipment could be improved upon prompted the CAB to withhold further expansion of the helicopter

---

[1]David A. Brown, "Helicopters Showing Strong Rise in Corporate Sales," Aviation Week, March 6, 1967, p. 306.

[2]Gerald J. McAllister, ed., 1963 Aerospace Facts and Figures, Aerospace Industries Association of America, Inc. (Los Angeles: Aero Publishers, Inc., 1963), p. 141.

service experiment. The basic reason for this restriction was the increasing annual federal subsidy that was required to support the three helicopter airlines.[1] It will be shown in Chapter Four that pressure for reduction of the subsidy was being applied by the Congress.

Again, clearly, the helicopter manufacturing industry found that a large civilian commercial helicopter market did not warrant the time and expense required to develop an aircraft to meet that sector's needs. Practical economics dictated that the manufacturing industry fulfill the requirements of its largest customer and steer away from a market that consisted of four operational commercial carriers.

The Airlines

Since 1947, five commercial helicopter airline operators have been certificated by the Civil Aeronautics Board (CAB) to provide mail, cargo, and passenger service in four metropolitan areas. These airlines were Los Angeles Airways, Chicago Helicopter Airways, New York Airways, San Francisco-Oakland Airlines, and Washington Airways. The first four companies will be discussed according to the date of their origination. Information on the route structure, sample fares at a selected time in their history, availability of heliports, and the type of helicopters utilized since certification are provided to give the reader a perspective of helicopter airline operations.

Washington Airways, as of this writing, has not yet inaugurated service, and there is some question whether it will. Because of this peculiar situation, this carrier's historical development will be presented last.

---

[1] "Washington Helicopter Network to be Studied," Aviation Week, December 19, 1960, p. 29.

Los Angeles Airways (LAA)

LAA was the pioneer of scheduled commercial helicopter airline service. Formed by a group of businessmen led by Clarence M. Belinn, the company filed for a certificate of convenience and necessity for six feeder routes in the Los Angeles area on May 20, 1944. The CAB denied that initial request.[1]

On March 26, 1945, LAA filed a second time, requesting authority to service four routes. Portions of the request were approved by the CAB, and a three year temporary certificate was granted on May 22, 1947.[2] In essence, the certificate authorized the carriage of mail and cargo--no passengers--over a system that connected the Los Angeles Post Office terminal annex building downtown with thirty selected suburban post offices within a fifty-mile radius of the terminal. This system was officially designated Route 84 by the CAB. Flight operations commenced on October 1, 1947.[3] The award was predicated primarily on the basis of time that would be saved by employing helicopters vice surface transportation between the post offices and the airport. Provisions were made in the award for changes in the initial flight pattern without LAA having to resort to formal proceedings with the CAB.[4]

With the experience acquired through this basic mail route, LAA requested on May 17, 1949, that the CAB grant the authority to carry

---

[1]CAB, Docket 1408, Order No. 420-401(b)-1.

[2]CAB, Docket 1821, Order No. 420-401(b)-2.

[3]U.S., CAB, "Milestones," Handbook 1969, p. 435.

[4]*Ibid.*, "Major CAB Actions," p. 460.

passengers.[1] LAA did not originally seek authority to carry passengers in 1947 because neither the helicopters they owned nor any helicopters available on the market at that time were suitable for the scheduled transportation of persons. But it was realized soon after commencement of operations that mail and cargo would not sustain helicopter operations, and that economic self-sufficiency would be realized only when passengers would be authorized also.[2]

On July 5, 1951, the CAB approved LAA's request for passenger service, but contingent upon development of a passenger helicopter.[3] As in the case of LAA's mail certificate, avoidance of formal certification proceedings was granted by the CAB when expeditious and frequent modifications of the passenger route pattern were necessary. This exemption to engage in passenger service under an area concept allowed flexibility of operations in this crucial stage of commercial development.[4] Passenger service was inaugurated on November 22, 1954.[5]

The granting of CAB's authorization for commercial passenger service in 1951 unofficially designated LAA as the prime "guinea pig" in helicopter operations. The federal civil aviation agencies focused upon LAA when questions of helicopter ". . . route development, and development of instrument flying, heliports and other prerequisites

---

[1]CAB, Docket 3800, Order No. E-5506-7.

[2]"LAA Plans Include Carrying Passengers," Aviation Week, June 6, 1949, pp. 49-50.

[3]"LAA Readies Passenger Copter Service," pp. 55-56.

[4]CAB, "Major CAB Actions," Handbook 1969, p. 462.

[5]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 144.

. . ." arose.[1]

LAA's route configuration was patterned to conform with the topography of southern California. The metropolitan area which consists of cities as large as ". . . Baltimore, Charlotte, N.C., Miami, Pittsburgh, Boston, Cleveland, Oklahoma City, Newark, Little Rock, Seattle, and Washington . . ."[2] is bounded on all sides by a topographical feature. To the west is the Pacific Ocean and to the east is the Southern Sierra range of the Rocky Mountains. The north and south are bounded by the foothills of the Sierras. In effect, LAA serves a vast basin composed of four counties: Los Angeles, Orange, Riverside, and San Bernardino--an area larger than the four states of New Hampshire, Massachusetts, Connecticut, and Rhode Island combined.[3]

Helicopter service allowed these huge communities access to the Los Angeles International Airport--the one airport in the area capable of handling all the trunk airlines. If this service was not provided, each city would be required to have its own airport with the attendant expense and the sacrificing of space if it wished aviation transportation.

At its zenith of service, the LAA system was divided into four segments for schedule making and utilization purposes (see Figure 3). Segments A and C were the shorter run routes to the Van Nuys and North Hollywood area on the north and the Newport Beach area to the south.

---

[1]Alexander McSurely, "Copter Firms Reveal Commercial Plans," Aviation Week, November 12, 1951, pp. 13-14.

[2]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 172.

[3]Ibid., p. 165.

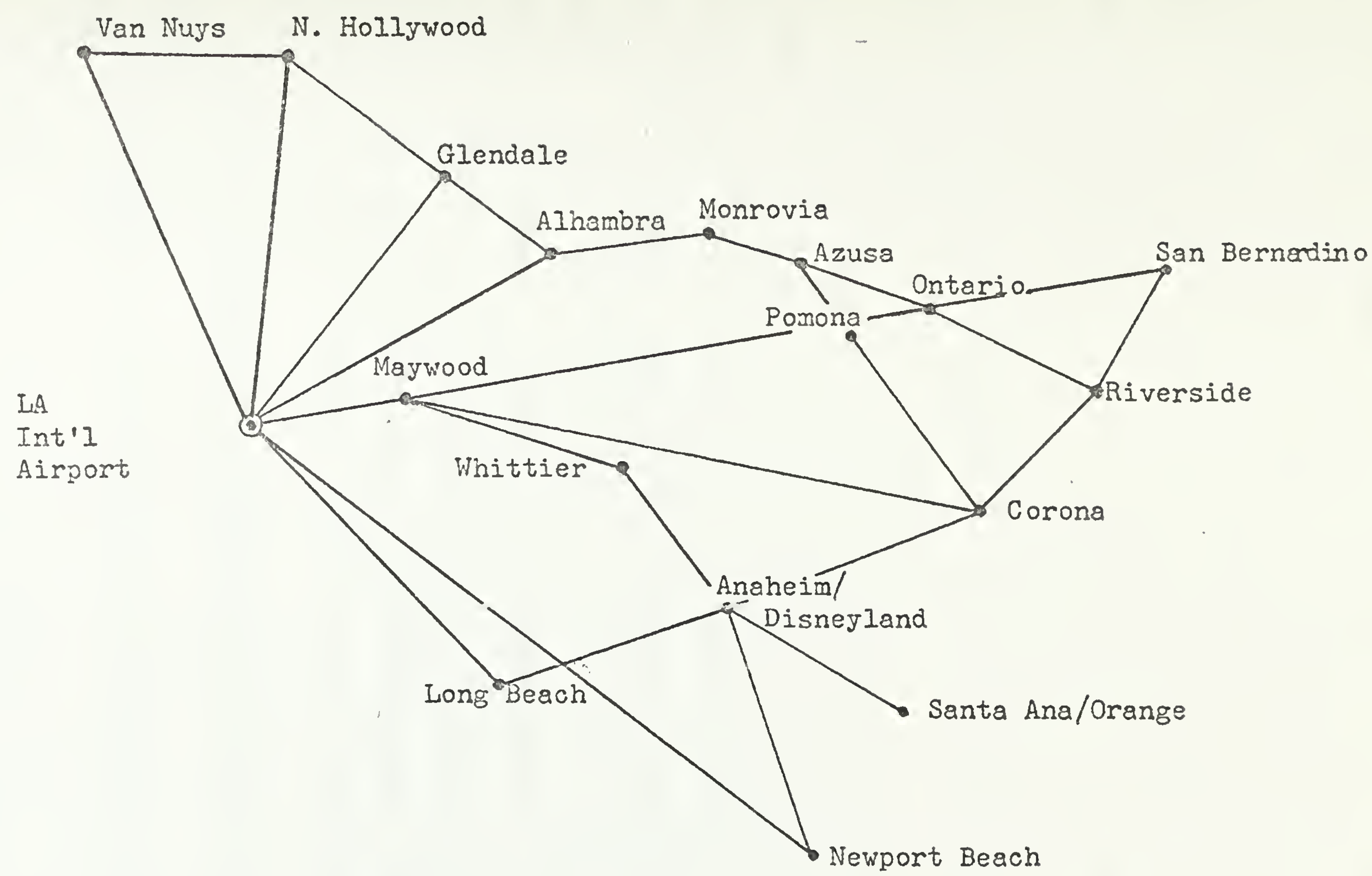

Fig. 3.--Los Angeles Airways Helicopter System - 1965

Source: U.S., Congress, Senate, Committee on Commerce, <u>Helicopter Air Service Program</u>, Aviation Subcommittee, 89th Cong., 1st sess., p. 157.

Segment B was the run to San Bernardino to the east.[1] This segment was the longest stage length (e.g., distance between two points), which was sixty-five miles. Segment A was the shortest, totaling approximately twenty miles. The average passenger was carried more than forty miles.[2] Shuttle service to the Los Angeles main post office downtown was Segment S.[3] The hub of LAA's system was the Los Angeles International Airport which fed traffic to and from the area's large communities. It was calculated in 1962 that ninety-four percent of LAA's passengers were continuing airline passengers.[4] The points served, mileages, and fares, as of 1965, are shown in Table 3.

LAA's fare structure in 1963 was deliberately set to approximate the most ". . . acceptable form of competitive transportation . . ." The three basic forms of competition for LAA were the taxi, the limousine, and the local airlines. This did not hold true in every case, but generally it did. Surprisingly, LAA did not consider the private automobile as competition.[5] The price of a ticket was based on a minimum charge plus $1.00 for each ten miles from the International Airport. The basic price was $4.00 and was called a handling charge. These ten-mile segments were labeled by zones: 0-10 local zone, 10-20 city zone,

---

[1]William H. Gregory, "Los Angeles Airways Expands with S-61's," Aviation Week, April 10, 1961, p. 42.

[2]Hearings before the Senate Aviation Subcommittee, Helicopter Program, pp. 165-66.

[3]Gregory, "Los Angeles Airways Expands," p. 42.

[4]"S-61L Stimulates LAA Passenger Traffic," Aviation Week, August 27, 1962, p. 41.

[5]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 169.

TABLE 3

LOS ANGELES AIRWAYS' POINTS SERVED, MILEAGES, AND FARES - 1965

Segments	Mileage from Los Angeles Airport	Passenger Fare
A - Van Nuys	19	$6.00
Burbank	15	6.00
Glendale	18	6.00
B - Pomona	36	8.00
Ontario	47	9.00
San Bernardino	65	10.00
Riverside	59	10.00
Whittier	19	7.00
C - Anaheim	29	7.00
Newport Beach	43	8.00

Source: U.S., Congress, Senate, Committee on Commerce, Helicopter Air Service Program, Hearings before the Aviation Subcommittee, Senate, 89th Cong., 1st sess., 1965, p. 148.

20-40 suburban zone, and 40-65 extended area zone.[1]

With this fare arrangement, the typical price for the flight to Disneyland from the airport was $7.00. San Bernardino was $10.00. The cost of flight to Van Nuys, the shortest stage length, was $6.00.[2]

From the inception of LAA's service in 1947, the airline's desire for community heliports was met enthusiastically by the local governments. Realizing the expense involved in acquiring their own airports, these communities participated to the maximum extent in providing helicopter facilities. They provided an approximate two-acre

[1] Gregory, "Los Angeles Airways Expands," p. 45.

[2] Ibid. See also CAB, Docket 12869, Order No. 3-19283.

parcel of land; would usually remove it from the tax rolls; and would lease it to LAA on a long term basis. Typical examples of this community accommodation are shown in Table 4.

TABLE 4

LOS ANGELES AIRWAYS' HELIPORT DATA

Heliport	Term (Years)	LAA Construction Cost	Annual Rental
San Bernardino	10	$28,000	$600
Riverside	15	31,000	1
Anaheim	5	32,000	300
Whittier	15	22,000	1
Newport Beach	20	14,500	300
Van Nuys	3	0	1
Glendale	7	4,000	300
Pomona	5	820	600

Source: U.S., Congress, Senate, Committee on Commerce, Helicopter Air Service Program, Hearings before the Aviation Subcommittee, Senate, 89th Cong., 1st sess., 1965, pp. 145, 169.

The big disappointment of the LAA management was the inability to establish a passenger heliport in downtown Los Angeles. Rooftop landings were made atop the terminal post office building, but this was restricted to mail flights. A number of factors were responsible for this situation. By 1962 a number of heliports had been constructed atop downtown buildings, but they were capable of handling only small, light helicopters and not the large passenger carrying models. Parking lot sites were considered, but then dropped because of the noise problem, the loss of valuable parking space, and the loss in county revenues realized from monthly parking fees. The downtown heliport problem was compounded by the lack of a central marketing area as

existed in New York or Chicago. Such a situation required the construction of more than one heliport.[1]

Even had there been a heliport atop a downtown building capable of supporting a large helicopter, the need to satisfy government regulatory agencies at the local and federal level on matters of safety still existed. The Federal Aviation Administration (FAA), in particular, felt as late as 1964 that not enough data on twin-engine turbine passenger helicopters operating from rooftops had been accumulated to warrant approval of that type of service.[2] This would be the case with two other helicopter airlines.

LAA began mail and cargo service in 1947 with five Sikorsky S-51 helicopters. This type of craft was retained until 1963. Not capable of carrying more than two to three passengers because of space and power requirements, it was used strictly for mail service.

The development of the larger Sikorsky S-55 in 1950, the authority to carry passengers, and the certification of the S-55 as the first helicopter approved for commercial passenger operations[3] prompted the purchase of five such models in 1952. The airline used the S-55 in mail and air express service prior to passenger operations beginning November, 1954.[4]

---

[1]William S. Reed, "Los Angeles Helicopter Utilization Grows," Aviation Week, March 5, 1962, pp. 57-58.

[2]James R. Ashlock, "Weight Limit Curtails Helicopters at Fair," Aviation Week, May 18, 1964, pp. 40-41.

[3]U.S., CAB, "New Aircraft Types," Handbook 1963, p. 494.

[4]Hearings before the Senate Aviation Subcommittee, Helicopter Program, pp. 143-44.

The S-55 was the backbone of LAA operations for ten years. The possibilities of twin turbine-powered helicopters were brought to the attention of the operators in 1955; LAA conserved funds and prepared for that day.[1]

The limitations of the S-55 were soon realized a few years after their purchase. Passenger service had expanded to the point that the six-seven passenger S-55's could not handle the demand. This limitation was complicated by the carriage of mail required under the airline's subsidy provision. Because of the subsidy, mail received first priority. This hampered development of the passenger market to its full potential because passenger space was frequently taken up by the mail.[2]

September 9, 1960, LAA leased a Sikorsky S-62 for one year. This became the first turbine powered helicopter in scheduled airline service.[3] The S-62 was designed from the start for amphibious operations. The bottom of the fuselage was watertight and strengthened to permit landings on water and snow. Because the S-62 was a single-engine turbine helicopter and utilized components of the S-55 (such as the rotor blades, main and tail rotor heads, main and intermediate gearboxes, shafting, tail rotor pylon, and portions of the flight controls and hydraulic systems),[4] it was considered essentially an interim helicopter--to be used until the twin-engines came on the market.

---

[1] Ibid.

[2] Gregory, "Los Angeles Airways Expands," p. 42.

[3] CAB, "New Aircraft Types," Handbook 1969, p. 489.

[4] Leonard Bridgman, ed., Jane's All The World's Aircraft 1960-1961 (New York: McGraw-Hill Book Company, 1960), p. 390.

LAA entered the interim lease arrangement with Sikorsky because of two reasons: 1) the airline had reached the saturation in terms of fleet capacity for transporting mail, express cargo, and passengers; 2) type certification technicalities by the FAA caused delay in the delivery of the S-61.[1] LAA utilized the ten-passenger S-62 to familiarize pilots and grounds on turbine operations and to evaluate the craft's performance on the line's system.[2]

In anticipation of twin-engine service, LAA placed an order for five S-61's in 1959. In November, 1961, three S-61's were received and placed into partial revenue service.[3] March 1, 1962, LAA placed the S-61 into airline service carrying passengers--the first line to do so.[4] The introduction of the S-61 represents the zenith of commercial helicopter passenger aircraft. It has not been replaced. It was the first twin-turbine helicopter and the first to receive a type certificate for instrument operations. Both aspects allowed safer flights and greater utilization.[5] The increased capacity (twenty-five to twenty-eight passengers) eliminated the disadvantages of the S-55, and the increased speed allowed more frequent service between points. A comparison of the S-61's increased frequency ability can readily be seen when compared with surface transportation and the older S-55.

---

[1]Los Angeles Airways, 1960 Annual Report.

[2]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 148.

[3]Los Angeles Airways, 1961 Annual Report.

[4]CAB, "New Aircraft Types," Handbook 1969, p. 489.

[5]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 158.

Table 5 gives the times between the Los Angeles International Airport and selected cities.

TABLE 5

LOS ANGELES AIRWAYS' EQUIPMENT TIME COMPARISON

City	Time in Minutes		
	Surface	S-55	S-61
Alhambra	75	17	11
Ontario	150	38	25
San Bernardino	180	50	34

Source: William H. Gregory, "Los Angeles Airways Expands with S-61's," Aviation Week, April 10, 1961, p. 45.

On October 22, 1970, LAA filed a request with the CAB to suspend service for one year on all of its routes. At the same time, the airline filed a petition for reorganization under Chapter XI of the Bankruptcy Act, listing assets of $3.2 million and liabilities of $8.1 million.[1] The CAB approved the request for cessation of service on December 28, 1970, on the grounds that one year should allow sufficient time for LAA to analyze its financial position and arrange for service to be resumed.[2]

[1]"News Report," Moody's Transportation, January 22, 1971 (Lancaster, Pa.: Moody's Investor Service, Inc., 1971), p. 1831.

[2]CAB, Docket 22670, Order No. 70-12-146.

Chicago Helicopter Airways (CHA)

Originally known as Helicopter Air Services, Chicago Helicopter Airways was incorporated in the State of Delaware on November 13, 1946.[1] Thirteen days later the company applied for a certificate of convenience and necessity to serve four routes out of the Chicago Municipal Airport. On November 24, 1948, the CAB approved CHA's request. Route 96 was established to carry mail and property over three suburban routes and between Midway Airport and the post office roof in downtown Chicago.[2] Operation of the airline began on August 20, 1949, with six Bell 47D helicopters.[3] The 47D was a small, single engine helicopter having a seat for the pilot and a passenger, both enclosed by a plexiglass canopy.[4]

It is apparent that CHA's development paralleled that of LAA's in the beginning by the initiation of mail service first. July 31, 1956, CHA requested approval for passenger operations. CAB granted a temporary to CHA on August 20, 1956, approving that request. It was at this time that Helicopter Air Service became Chicago Helicopter Airways.[5] In September, 1956, CHA accepted three seven-passenger Sikorsky S-55 helicopters, and on November 12, 1956, commenced regularly scheduled helicopter passenger service.[6]

---

[1]John Sherman Porter, ed., Moody's Transportation Manual 1959 (New York: D. F. Shea, Publisher, 1959), p. 1405.

[2]CAB, Docket 2673, Order No. E-2233.

[3]George L. Christian, "Helicopter Mail Rings Bell in Chicago," Aviation Week, January 5, 1953, pp. 56-63.

[4]CAB, "New Aircraft Types," Handbook 1963, p. 493.

[5]CAB, Docket 8151, Order No. E-10548.

[6]Chicago Helicopter Airways, 1956 Annual Report.

CHA's passenger route structure was centered around the three points of Chicago, Midway Airport, and O'Hare Field, in its initial certification in 1956. In May, 1957, the suburban points of Gary, Indiana, and Winnetka, Illinois, were added to the "golden triangle," to achieve the maximum route development of the CHA system.[1]

The prime factor in CHA's growth up until 1962 was the opening of O'Hare Field in 1956 in preparation for jet traffic in the summer of 1959. Because jet operations by the trunk airlines were restricted to O'Hare Field, time conscious travelers arriving at Midway needed an expeditious means of transportation to O'Hare Field--a distance of sixteen miles.[2] Approximately two-thirds of CHA's passengers were carried between these two points. The other one-third traveled between O'Hare Field and downtown Chicago.[3] As was the case with LAA, a high percentage of CHA's traffic was inter-airline--approximately ninety percent.[4]

CHA's suburban passenger and mail routes were unsuccessful because of the directional imbalance in passenger and mail loads. Again, this was a problem LAA had on their routes. Mail flights frequently had full loads going to the suburbs, but they were empty on the inbound flights. The same situation was encountered on the passenger routes. Full passenger loads were realized inbound in the

---

[1]Chicago Helicopter Airways, 1957 Annual Report.

[2]Glenn Garrison, "Jets Boost Chicago Helicopter's Traffic," Aviation Week, May 9, 1960, p. 43.

[3]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 277.

[4]Garrison, "Jets Boost Traffic," p. 43.

mornings and outbound in the evenings during the week. At other times than that just mentioned, the aircraft were empty.[1] Figure 4 illustrates the mail and passenger route structure of CHA.

The fares in 1965 between points on the CHA system are shown in Table 6.

TABLE 6

CHICAGO HELICOPTER AIRWAYS' POINTS SERVED AND FARES 1965

	City	Gary	Midway	O'Hare	Winnetka
Chicago	-	$ 8.00	$5.00[a]	$6.00	$ 8.00
Gary	$8.00	-	6.00	9.00	14.00
Midway	5.00[b]	6.00	-	6.00	8.00
O'Hare	6.00	9.00	6.00	-	5.00
Winnetka	8.00	14.00	8.00	5.00	-

[a]$6.00 via O'Hare.

[b]$6.00 via O'Hare.

Source: Chicago Helicopter Airways, April 1, 1962 Timetable. (Note: Fares were the same in 1965.)

The distances between the five points served by CHA are shown in Table 7.

---

[1]*Ibid.*, p. 44.

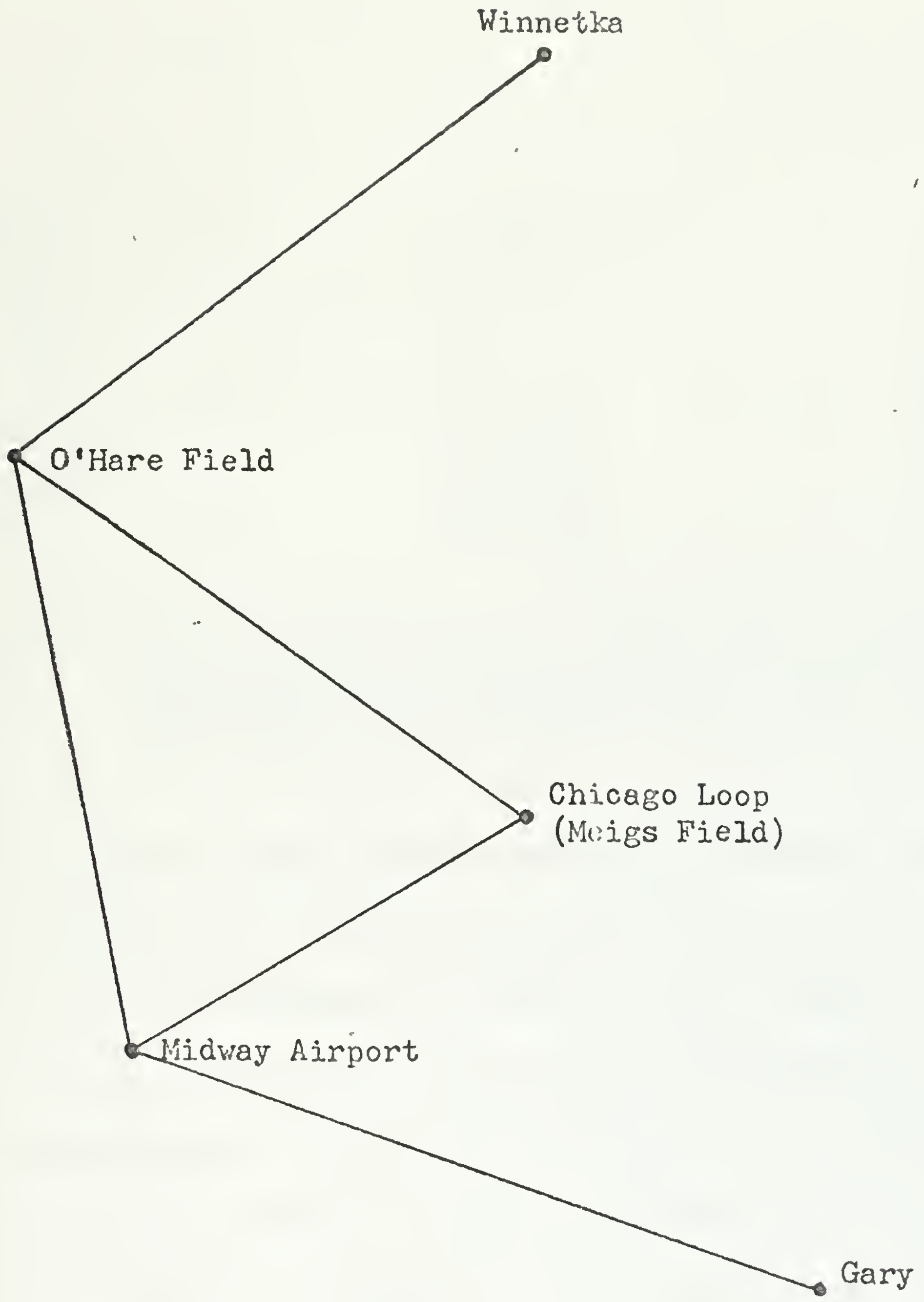

Fig. 4.--Chicago Helicopter Airways System - 1960

Source: Chicago Helicopter Airways, 1960 Annual Report.

TABLE 7

CHICAGO HELICOPTER AIRWAYS' POINTS
SERVED AND DISTANCES 1965

From	To	Miles
Midway	O'Hare	16
Midway	Chicago	9
Midway	Gary	21
O'Hare	Chicago	17
O'Hare	Gary	37
Chicago	Gary	30
Midway	Winnetka	28
O'Hare	Winnetka	12
Chicago	Winnetka	29
Gary	Winnetka	49

Source: U.S., Congress, Senate, Committee on Commerce, Helicopter Air Service Program, Hearings before the Aviation Subcommittee, Senate, 89th Cong., 1st sess., 1965, p. 264.

All passenger stops served by CHA were airports; consequently, the line was spared the building and maintenance expense that other helicopter carriers experienced. However, CHA met some frustration in trying to establish a heliport that was more convenient to passengers wishing transportation to and from the Chicago stop. Again, because of FAA's insistence that safety of flight in downtown areas required that passenger helicopters be equipped with twin engines, CHA was not allowed to construct a heliport at Grant Park. This ideal location was easily accessible to the complex of hotels fronting the park and Lake Michigan. The closest that CHA could operate to city center at the downtown location was Meigs Field, which was a general aviation airport located south of the hotel area and below the Soldiers Field Stadium. It is

believed that this less than ideal location, plus the $1.00 plus taxi fare, was a substantial factor in preventing CHA from realizing the full potential of traffic between Chicago and Midway and O'Hare airports. It was estimated that forty-eight percent of the total air passenger traffic generated in the Chicago area originates or terminates in downtown Chicago. CHA plans to utilize the rooftop of the proposed Transportation Center were never realized. Rooftop helicopter service was provided in downtown Chicago by CHA; but, as was the case with LAA, it was reserved for mail flights only to the downtown post office with the small, light Bell 47.[1]

It was mentioned in the beginning that CHA began mail service with Bell 47's, and with the implementation of passenger operations, they utilized the Sikorsky S-55. To increase the capacity of its equipment to meet the steadily rising traffic between O'Hare and Meigs Field, CHA began delivery of the first of eight Sikorsky S-58 helicopters in 1957, a year after commencement of passenger operations.[2] In 1959 a conditional order for six Sikorsky S-61's was placed,[3] but unforeseen circumstances prevented acquisition of what would have been CHA's first twin-turbine helicopter. CHA retained its aging S-58's with the hope of converting them to a twin-turbine configuration.[4]

---

[1]Hearings before the Senate Aviation Subcommittee, Helicopter Program, pp. 274-80, 282, 335-42.

[2]Chicago Helicopter Airways, 1957 Annual Report.

[3]Chicago Helicopter Airways, 1959 Annual Report.

[4]Hearings before the Senate Aviation Subcommittee, Helicopter Program, pp. 268-70.

On December 31, 1965, CHA suspended certificated service to coincide with the federal subsidy cutoff even though there were still eleven months remaining under its CAB certificate. The carrier continued its contract and charter air service, however.[1] Scheduled service was resumed on May 29, 1969, under the same name but as a subsidiary of Chicago Helicopter Industries, Incorporated.[2]

New York Airways (NYA)

NYA was incorporated in the State of Delaware on August 31, 1949,[3] and submitted an application to the CAB on September 6 of that year requesting the authority to operate helicopter passenger routes in the New York City area.[4] At the recommendation of a CAB examiner, the CAB officially awarded NYA a temporary certificate of public convenience and necessity on March 12, 1952, to operate the requested routes. NYA's competitor in the award competition, Metropolitan Air Commuting, lost because of NYA's equity obtained with a private issue instead of a public issue, and NYA's backing was strong.[5] A qualification in the award was that passenger operations would not be allowed to commence until sufficient mail and property service had been undertaken to assure proper handling of passengers. This qualification classified NYA as the first helicopter airline authorized to carry passengers. LAA had applied

---

[1]CAB, Docket 16721, Order No. E-23050.

[2]Chicago Helicopter Industries, Inc., 1970 Annual Report.

[3]Porter, Moody's Transportation Manual 1959, p. 1408.

[4]CAB, Docket 4077, Order No. E-6206.

[5]"Scheduled Passenger-Copters for New York?" Aviation Week, November 6, 1950, p. 46.

earlier, but its first request was denied.[1]

On October 15, 1952, NYA began mail and cargo operations. Unlike LAA and CHA, NYA was not blessed by the Post Office Department in its early days of operations. The post office authorities did not consider air mail service by helicopter necessary in the New York area for two reasons: 1) surface transportation from downtown New York to the three main airports was considered fast enough not to impede the quality of air mail service, and 2) helicopters were not allowed to land on the General Post Office Building roof in the city. The powerful New York Port Authority, who was a strong proponent of commercial helicopter service in the city, overcame this obstacle by emphasizing the merits of passenger service to the CAB, knowing that the right to mail service would be granted along with it.[2] Of course, as we've seen, the right to mail carriage was granted despite the fact that ". . . no suitable heliport on or near enough to the metropolitan post offices . . ." was available. An East River heliport on Manhattan was provided in the early stages of mail operations and a mail truck transported the mail from there to the central post office in Manhattan.[3]

Passenger operations began on July 8, 1953, becoming the first United States helicopter airline to provide such a service. The pioneer of helicopter service, LAA, did not begin passenger operations until November 22, 1954. Also, it should be noted that British-European Airways (BEA) of Great Britain offered the world's first helicopter

---

[1]*Ibid.*, p. 48.

[2]Altschul, "CAB Faces Helicopter Problem," p. 35.

[3]"NY Copter Service Starts This Week," *Aviation Week*, October 13, 1952, p. 18.

passenger service. But because it only lasted from June 1, 1950, to March 31, 1951, NYA is considered the world's first sustained service.[1]

From the time of NYA's origin, it was that line's plan to provide service in three areas of helicopter operations: 1) inter-airport limousine service, 2) skybus commuter service between small surrounding communities and New York City, and 3) airport to downtown Manhattan service.[2] All three aspects were to be fulfilled by NYA to a certain extent during its history though not to the extent envisioned.

The certificate granted by CAB provided for helicopter service in the metropolitan area including LaGuardia, New York International (now known as John F. Kennedy International Airport), and Newark airports and a Manhattan heliport. In addition, four clover-leaf segments going out of LaGuardia and Newark airports and serving thirty-five suburban points were authorized. To provide flexibility, any point within a fifty-mile radius of LaGuardia and Newark airports was authorized service without recourse to formal proceedings with the CAB.[3] The NYA route was designated Route 111.

The inauguration of NYA service in October, 1952, began with mail flights between the three main airports in the New York City area: John F. Kennedy, LaGuardia, and Newark.[4] These three stops became the foundation of NYA's passenger route structure. Later, Manhattan service was provided variably at the Wall Street heliport, 30th Street heliport on the Hudson River, and/or the heliport atop the Pan American Airways

---

[1] Davies, World's Airlines, p. 475.

[2] Alexander McSurely, "Reveal Details of Transport Helicopters," Aviation Week, January 2, 1950, pp. 14-16.

[3] "Copters for N.Y.?" Aviation Week, pp. 47-48.

[4] "NY Copter Service Starts," Aviation Week, p. 18.

Building at Grand Central Station. Over the history of the airline, suburban points such as Stamford, Connecticut; White Plains, N.Y.; Teterboro, N.J.; and Westchester, N.Y. were served at varying times. The plan to serve thirty-five suburban communities never materialized. Because of the frequency of changes in the route structure, it is difficult to provide a diagram representing the extent of maximum route development. However, Figure 5 provides a pattern of the routes flown by NYA in 1966. The three airports originally authorized service in NYA's initial certification are still the primary sources of traffic. Compared to LAA's forty mile average journey of its passengers, NYA carried its passengers an average of twenty miles.

Table 8 gives the points served by NYA, the distance, and the fares as of 1965.

TABLE 8

NEW YORK AIRWAYS' POINTS SERVED, DISTANCES, AND FARES 1965

Between	Distance (miles)	Fare
Newark to Kennedy	21	$10.00
Newark to Wall Street	9	9.00
Wall Street to Kennedy	12	8.00
LaGuardia to Kennedy	10	6.00
LaGuardia to Wall Street	8	7.00
LaGuardia to Newark	16	10.00

Source: U.S., Congress, Senate, Committee on Commerce, Helicopter Air Service Program, Hearings before the Aviation Subcommittee, Senate, 89th Cong., 1st sess., 1965, p. 216.

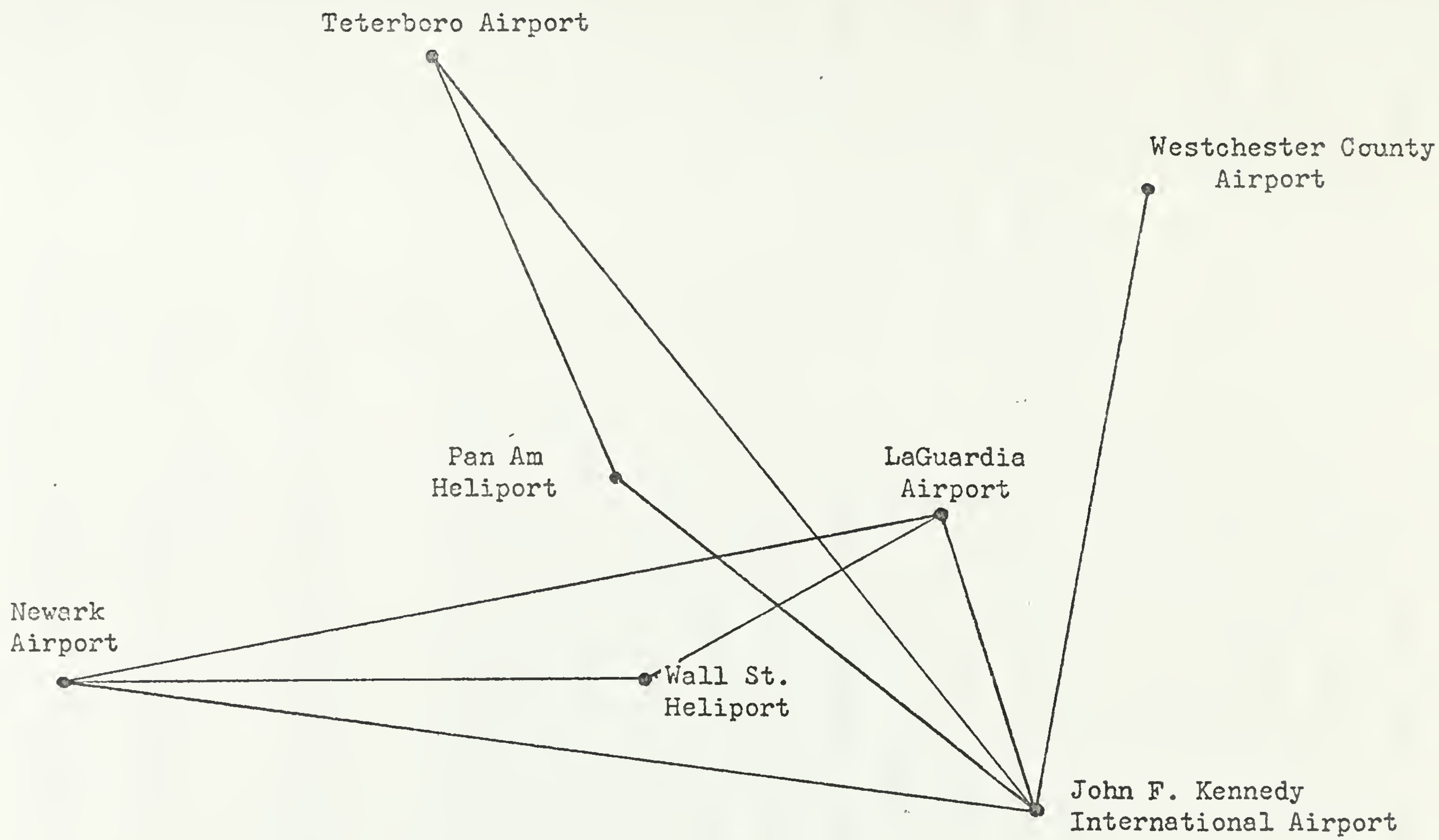

Fig. 5.--New York Airways Helicopter System - 1966

Source: New York Airways, 1966 Annual Report.

NYA's first heliport for passenger service was located at West 30th Street on the waterfront in Manhattan. The New York Port Authority's eagerness for helicopter service in New York City was the prime factor in obtaining the heliport.[1] In November, 1960, NYA operations were shifted from the West 30th Street location to the new Wall Street heliport.[2] This location was more convenient to the substantial segment of NYA's passengers who were, for the most part, businessmen.

The controversial heliport on NYA's system was the rooftop heliport atop the Pan American Airways building above the old Grand Central Station in mid-Manhattan. It was realized early in NYA's history that a rooftop heliport in a central location in Manhattan would be essential in maximizing the potential of passenger operations in the downtown area. A New York Port Authority survey showed that the midtown area could provide fifty percent of all Manhattan traffic to and from the city's three airports. And the Wall Street heliport could not effectively serve this market because of its location at the southern tip of Manhattan.[3] Negotiations between NYA, Pan American Airways, and the building corporation for the heliport began in 1962 in hopes of placing it in operation in 1963.[4]

---

[1] "Volume of Complaints Measures Need for Helicopters," Aviation Week, February 25, 1957, p. 265.

[2] CAB, Docket 11859, Order No. 16056.

[3] "NY Airways Revenues Linked to World's Fair, Heavier Schedules," Aviation Week, February 24, 1964, p. 39.

[4] Glenn Garrison, "NY Airways 107 Fleet Keyed to Subsidy," Aviation Week, October 30, 1961, p. 38.

However, municipal and federal regulations, and local opposition from owners of nearby buildings and citizens groups, delayed service from this location for over two years from the date that operations from the heliport were planned to have begun. Four municipal agencies were required to approve the heliport site, and their job was complicated by some doubt among the four over which agency had the right to grant final approval. The four agencies were the City Planning Commission, the Traffic Department, the Board of Estimates, and the Department of Marine and Aviation.[1] The biggest hurdle faced by NYA was that the heliport was located in an area not zoned for such a structure, and a zoning variance would not authorize its construction. Consequently, time-consuming public hearings had to be conducted prior to NYA's application submission to the FAA for their evaluation of safety standards.[2]

The FAA's approval was slow in coming for two reasons. They felt that a twin-engine helicopter in a one-engine-out emergency must be able to maintain take-off speed on one engine and clear the heliport edge by thirty-five feet. Landing standards in the same condition required that the helicopter clear a fifty-foot obstacle.[3] Because achieving such standards was dependent on the variable of weight or number of passengers and the two non-variables, outside temperature and humidity, the FAA eventually granted approval by limiting the number of passengers allowed to be carried. Consequently, the Boeing V-107's

---

[1]James R. Ashlock, "Building Owners Fight Rooftop Heliport," Aviation Week, May 27, 1963, pp. 36-37.

[2]"NY Airways Revenues Linked to Fair," p. 39.

[3]Ashlock, "Weight Limit Curtails Helicopters," pp. 40-41.

twenty-five seat capacity was reduced to ten, thereby increasing the costs of operations.[1] A second reason was the presence of turbulence over the landing area. The FAA eventually approved operations when curved "cusps" were developed and installed along the edge of the rooftop to break up turbulent vortices and provide a smooth laminar air flow over the landing pad.[2]

The first organized opposition to the proposed Pan Am heliport came from the owners of other skyscrapers near the structure, including the Chrysler Building. They expressed concern over the danger to the public in light of NYA's helicopter suffering two forced landings in the Hudson River in 1962. Both were due to foreign objects being ingested into the engines during flight.[3] Also, the building owners said the noise from the helicopters would be a nuisance to local occupants of offices, hotels, and residences.[4] A citizens group was later formed and known as the Citizens Council for Proper Heliport Planning. They stressed the safety hazards to rooftop operations and favored ground-level waterfront sites. Commencement of operations from this heliport were further delayed by the Citizens Council taking court action against its opening.[5]

---

[1]"Helicopter Service Gasps for a New Lift," Business Week, June 1, 1968, p. 49.

[2]James R. Ashlock, "NYA Tailors Equipment Plans to Expansion of Heliports," Aviation Week, September 17, 1962, p. 41.

[3]James R. Ashlock, "Ingestion Causes V-107 Water Landing," Aviation Week, July 23, 1962, p. 33; and "Shield Sought for Vertol Engine Intake," Aviation Week, September 3, 1962, pp. 28-29.

[4]Ashlock, "Building Owners Fight," pp. 36-37.

[5]Joseph W. Carter, "Pan Am Heliport Foes Plan Court Battle," Aviation Week, January 25, 1964, p. 34.

Heliport operations eventually began in December, 1965, with an agreement with Pan American Airways that cost that trunk airline $4 million. This figure consisted of loans to NYA, purchase of three Sikorsky S-61 helicopters, and the building of a ticket office and lounge in the Pan Am building lobby. In return, NYA gave Pan Am an option to acquire a nineteen percent interest in NYA through a stock purchase and allowed the airline to feature service to Pan American customers.[1] Service was suspended to the Pan Am heliport on February 15, 1968, over disagreements concerning Pan American subsidies to NYA.[2]

NYA began operations in 1952 with Sikorsky S-55 helicopters. The press for more capacity to meet traffic demands and to provide more economical operation caused NYA to purchase five fifteen-passenger Vertol V44 helicopters in 1958.[3] Anticipation of twin-engine, turbine helicopters and the increasing costs of the V44 classified the V44 as an interim helicopter much like LAA's S-62. In January, 1961, NYA ordered ten Vertol V-107's with delivery expected in June, 1962.[4] Only four V-107's were eventually purchased by NYA. This twenty-five passenger twin-turbine, tandem rotor helicopter was the Sikorsky S-61's competitor in the commercial helicopter passenger field. The V-107 models were NYA's only operational helicopters although frequent attempts

---

[1]"Roof Heliport Gives Copter Line a Lift," Business Week, December 25, 1965, pp. 18-20.

[2]"Service at Heliport Facing Suspension," Aviation Week, February 19, 1968.

[3]"Three NYA Vertols Begin Scheduled Passenger Flights," Aviation Week, June 2, 1958, p. 30.

[4]Glenn Garrison, "NYA Plans Turbine Service," Aviation Week, January 9, 1961, pp. 45-47.

to supplement them with Sikorsky S-61's were planned.[1]

San Francisco-Oakland Airlines (SFO)

SFO was incorporated in the State of California on January 6, 1961. On January 9, 1961, it requested that the CAB grant authority to SFO to operate a helicopter passenger service within a 100-mile radius of San Francisco. On November 26, 1963, the CAB approved SFO's request to provide service specifically between San Francisco International Airport, Metropolitan Oakland International Airport, downtown San Francisco, downtown Oakland, Berkeley, Palo Alto, Sunnyvale, and points to Marin and Contra Costa Counties.[2]

Actually, SFO began passenger service June 1, 1961, as an air taxi service under a blanket exemption granted by CAB prior to its certification in 1963.[3] The airline had the authority from the California Public Utilities Commission to operate the intrastate service and the approval of the FAA that it met their requirements as an air taxi operator. The request for certification by the CAB was needed to allow SFO to carry the mail--with or without a subsidy from the government.[4]

---

[1]"World's Fair Sightseeing Service Delayed," Aviation Week, April 27, 1964, p. 41; and "Pan Am Plans to Finance New York Airways Service," Aviation Week, September 8, 1969, p. 24.

[2]CAB, Docket 12029, Order No. E-20214.

[3]"S-62 Service is Begun in San Francisco," Aviation Week, June 26, 1961, pp. 42-43.

[4]"New Helicopter Airline Organized," Aviation Week, January 16, 1961, p. 43.

SFO was unique among the other three commercial helicopter passenger services because it was the first helicopter airline to operate without a subsidy from the federal government. Because of this arrangement, it was also the first to receive a permanent certificate from the CAB.[1] LAA, CHA, and NYA initially operated under a temporary certificate because of the experimental nature of helicopter service and its subsidization by the CAB. SFO applied for a non-subsidy certificate because applications by other helicopter operators requesting subsidies were subject to prolonged delays.[2]

Like LAA and NYA, the route structure of SFO was dictated by the geography of the San Francisco area. LAA had a crowded topographical basin jammed with communities without a rapid public surface transportation system or an air network with its attendant airfields to connect them. NYA had the airfields, and a rapid public transportation system, but the bridges and tunnels necessary to surmount the water barriers created time consuming traffic congestion. SFO, too, had the airfields and a public transportation system (although not rapid), but the water barrier of San Francisco Bay separated the counties, and the series of mountains and hills that surrounded the bay were close to the shore creating a narrow land corridor which restricted traffic flow.[3]

Like NYA, the routes approved by the CAB for SFO operation and the routes actually served varied considerably. Initial service prior to certification provided service to the San Francisco airport, downtown

---

[1]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 283.

[2]"New Helicopter Airline Organized," p. 43.

[3]CAB, Docket 12029, Initial decision, p. 4.

San Francisco, Oakland airport, downtown Oakland, and Berkeley.[1] Downtown San Francisco service was suspended twice: once because of unsafe underpinnings on the pier, in 1963;[2] and another time because cracks developed in the pilings that were impractical to repair.[3] Figure 6 illustrates the points served as of 1969.

SFO's fares ranged from $6.50 to $8.50. The Oakland-San Francisco route--a distance of ten miles--cost $8.50. The airline's fare policy was priced on a self-sustaining basis that was designed to result in a breakeven operation at reasonably attainable load factors. Because of SFO's belief that scheduled helicopter transportation was a premium class product due to greater convenience and reduced travel time, its higher fare structure averaged 48 cents per passenger mile versus the 18 cents to 40 cents range of the three subsidized helicopter airlines. It was felt by SFO that these carriers were deliberately setting low fares that would not allow breakeven operations even at a 100 percent load factor.[4]

On the matter of heliports, it was SFO's policy to urge communities desiring scheduled helicopter service to construct their own heliport. It was SFO's experience that the average cost of a heliport facility that met its standards of large, paved, lighted parking areas; a modern and well-equipped terminal building; and a

---

[1]"New Helicopter Airline Has Early Success," Aviation Week, October 30, 1961, p. 39.

[2]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 291.

[3]San Francisco-Oakland Airlines, 1969 Annual Report.

[4]Hearings before the Senate Aviation Subcommittee, Helicopter Program, pp. 284, 288.

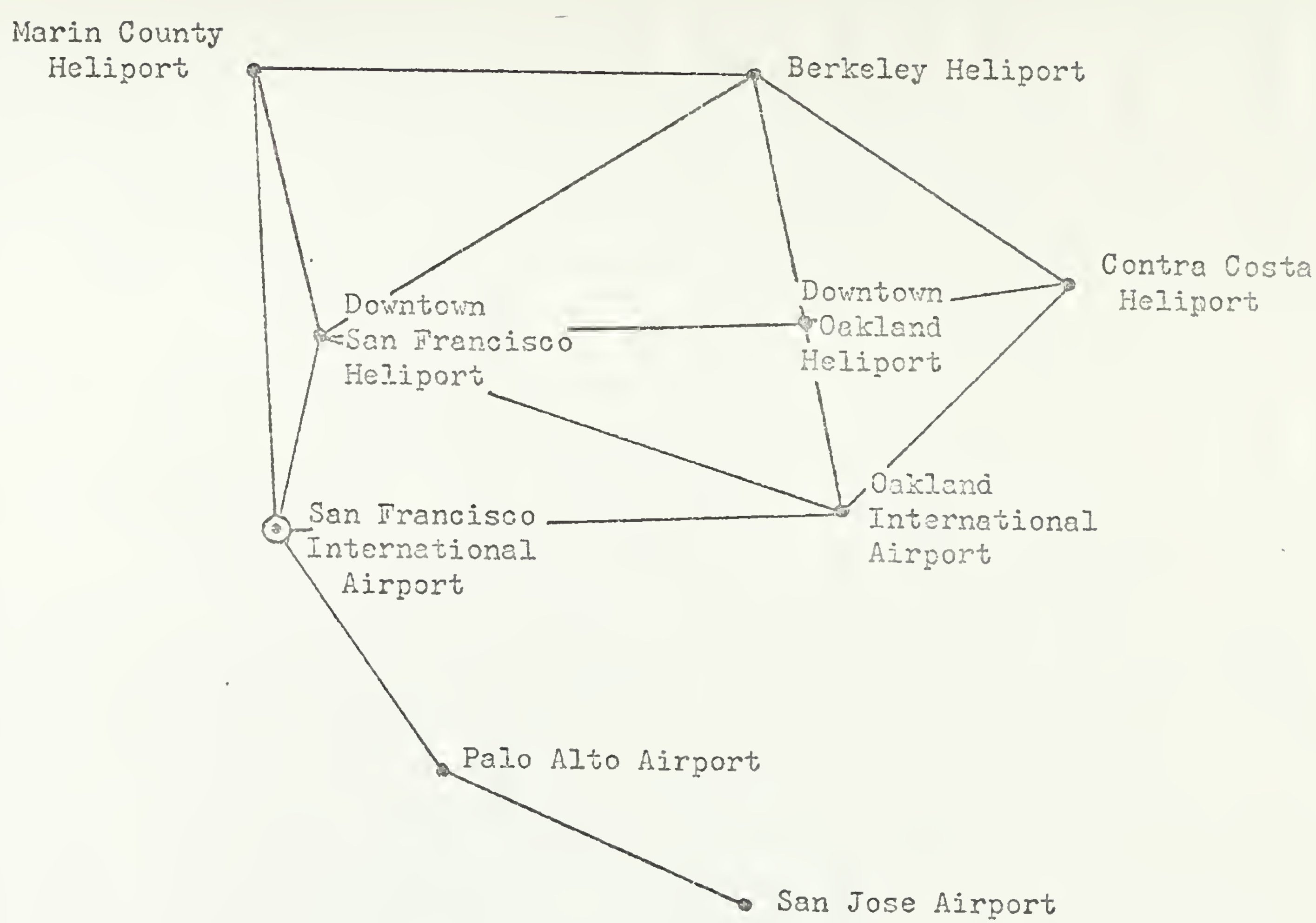

Fig. 6.--San Francisco-Oakland Airlines System - 1969

Source: SFO, <u>1969 Annual Report</u>.

convenient location, would cost approximately $25,000.[1]

SFO would then pay a rental charge to the community of 25 cents per passenger. In addition, SFO acted as a fixed-base operator in maintaining the facility and collecting landing fees from other helicopter operators. It was estimated that the 25-cent charge allowed the community to recover its $25,000 expenditure in three to five years.[2]

SFO had five heliports in operation at one time or another. The problems with the downtown San Francisco heliport have already been mentioned. Probably a more important reason for its closure was that the facility did not generate the traffic that the airline expected.[3] The downtown Oakland heliport was actually the first rooftop heliport for commercial passenger operations in the country. It was located atop a brand new circular municipal garage with a glass-enclosed waiting room and an elevator to the ground level.[4] The other three heliports were located at Berkeley, Contra Costa, and Marin County.

SFO began passenger operations in June, 1961, with two single-turbine Sikorsky S-62 helicopters. A third one was leased in January, 1962, from Sikorsky with a purchase option included. In February, 1965, SFO purchased the first of four S-61 helicopters to supplement the smaller S-62. Unlike LAA, who considered the S-62 an interim aircraft,

---

[1]Ibid., p. 285.

[2]Ibid.

[3]"New Management Retrenching at SFO," Aviation Week, February 23, 1970, p. 39.

[4]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 291.

SFO felt that their fleet should utilize both models. The larger capacity S-61 would be utilized in the peak hours when traffic was the heaviest and frequency of flights the highest. The smaller S-62 would be placed into operation on certain route segments and during slack traffic periods.[1]

On July 31, 1970, SFO requested that the CAB grant emergency authority to the airline to temporarily cease operations on all of its routes except the San Francisco and Oakland airports segment, which was the most profitable route. At the same time, a federal court granted the carrier's petition declaring bankruptcy under Chapter XI of the Bankruptcy Act. Chapter XI allows a firm to continue operations while in the process of reorganizing. The petition listed assets of $4.8 million and liabilities of $5.7 million.[2] The CAB approved the request on August 13, 1970.[3]

Washington Airways (WA)

Interest in providing commercial helicopter passenger service in the Washington, D.C. area was expressed in 1960. The CAB reversed a long-standing ban against consideration of expanding scheduled helicopter operations and began an investigation of the need for such a service. At that time Washington, D.C. ranked third in the number of flight departures and fourth in the number of passenger boardings. In addition, Dulles International Airport would be the third airport to serve the area, Washington's National and Baltimore's Friendship

---

[1] _Ibid._, p. 284.

[2] "Helicopter Airline Files for Bankruptcy," _Aviation Week_, August 10, 1970, p. 28.

[3] CAB, Docket 22420, Order No. 70-80-49.

airports being the other two.[1]

In August, 1963, the CAB ruled that " . . . public convenience and necessity did not warrant the expenditure of the subsidies that would have been necessary to support a helicopter service . . ." in the Washington area.[2] "Annual cost of the operation would have been two million dollars initially, increasing to a higher amount with very little prospect of any subsidy-free operation in less than six years."[3] Helicopter service without subsidy eligibility was contemplated by the CAB, but the eight applicants emphasized that they were unwilling to provide the service without an annual subsidy.[4] The CAB's reluctance to grant a certificate with subsidies stems from the Congress' efforts to reduce and eventually eliminate subsidy payments to the air carriers --especially the locally oriented helicopter carriers.

By August, 1966, sufficient interest in the Washington-Baltimore area helicopter service had been generated once again that the CAB instituted another investigation into its feasibility. On the 29th of that month the investigation began to determine whether public convenience and necessity required the authorization of scheduled helicopter service between National, Dulles, and Friendship airports and the downtown city centers of Washington and Baltimore.[5]

---

[1]"Washington Helicopter Network," p. 29.

[2]"New Congressional Interest Spurs Washington Helicopter Analysis," Aviation Week, August 29, 1966, p. 32.

[3]"CAB Rulings Reflect Helicopter Policy," Aviation Week, September 9, 1963, p. 38.

[4]Ibid.

[5]CAB, Docket 17665, Order No. E-24133.

In December, 1967, the CAB's Bureau of Operating Rights stated in its brief to the hearing examiner that the "high operating costs of present generation helicopters would not permit economically feasible helicopter service in the Washington, D.C./Baltimore area," and that "economic self-sufficiency is dependent on a vastly improved yield per seat mile cost relationship."[1] Despite this opinion, the bureau suggested that if the hearing examiner felt that a service test was in order, Washington Airways should be one of the five applicants awarded a certificate. WA was a company formed by ten of the fourteen airlines serving Washington-Baltimore, and it was felt that this company possessed the financial ability to sustain the helicopter experiment without some form of outside financial assistance.[2]

The hearing examiner concluded that a certificate should not be issued because there was ". . . no real or urgent need" for the service. Operating deficits would be so high that some form of financial assistance would be required for an indefinite period, and this would not be justified by this "luxury" service.[3] However, on November 18, 1968, the Board exercised its right of review and reversed the examiner's decision. On that date it issued a temporary certificate for Route 160 to WA ". . . authorizing the transportation of persons, property, and mail on a subsidy ineligible basis for a period of five years between Dulles International Airport; the intermediate points, Washington National Airport, downtown Washington, D.C., Friendship International

---

[1]"Operation Cost Cited in Helicopter Case," Aviation Week, December 18, 1967, p. 33.

[2]Ibid.

[3]CAB, Docket 17665, Order No. 68-11-71, p. 1.

Airport; and the terminal point, downtown Baltimore, Maryland."[1] The reasons for the reversal were 1) the belief that first-year traffic volume would be ". . . available to and benefited by a helicopter service," 2) that increased traffic volume in the following years were anticipated, and 3) the helicopter service would assist in meeting the needs of the area's required pattern of airline service.[2]

However, WA never commenced operation. Its official reason was that there were no downtown heliports available and that the possibility of acquiring them were minimal.[3] On September 16, 1970, WA filed an application seeking permission to abandon Route 160.[4] On November 19, 1970, the CAB reopened the Washington-Baltimore helicopter service investigation to simultaneously rule on WA's request for abandonment and to certify another carrier should WA's request be granted.[5]

At the present time Pioneer Airlines and Triangle Airways are seeking the authority to replace WA on Route 160.[6] Hearings on the investigation are scheduled for September 22, 1971.

It is interesting to note that while WA was still in the process of inaugurating service, a short take-off and landing (STOL) equipped non-certificated commuter airline known as Washington Airlines was operating between the three area airports. Flying German-built Dornier

---

[1]*Ibid.*, p. 1.

[2]*Ibid.*, p. 3.

[3]David A. Brown, "STOL, Helicopters Vie in Washington Area," *Aviation Week*, March 24, 1969, p. 30.

[4]CAB, Docket 22566.

[5]CAB, Docket 17665, Order No. 70-11-85.

[6]*Ibid.*, Order No. 71-2-61.

Skyservants, the company's initial load factors varied between eleven and fifteen percent on a sixty-four trips per day schedule. This schedule was eventually reduced to thirty-eight trips per day on weekdays, 22 trips on Sundays and holidays, and no service on Saturdays. These cutbacks boosted the load factor to approximately twenty-five percent, twenty-five percent short of its fifty percent breakeven point. During its operations, the airline found that there was very little city-center to city-center traffic.[1] In October, 1969, Washington Airlines suspended service because of the lack of traffic. The airline believed that a major factor was the competition received from the twenty daily flights between Washington airports and Friendship by certificated airlines and other air taxi and commuter carriers. A WA representative cited the Washington Airline's inability to provide direct downtown service as a factor in the airline's failure to attract passengers.[2]

Summary

World War II revealed the possibilities of helicopter operations in the civilian sector of the economy. At the termination of the war, helicopter mail service in the large, densely populated areas was begun, followed by passenger service in the 1950's. The CAB's efforts to evaluate helicopter transportation in the national air network prompted certification of three helicopter carriers in those early years: Los Angeles Airways, Chicago Helicopter Airways, and New York Airways.

---

[1]Brown, "STOL, Helicopters Vie," pp. 30-31.

[2]"Washington Airlines Ends Service," Aviation Week, October 6, 1969, p. 22.

Initial development of helicopter service was hampered, however, by the lack of suitable equipment to perform economically and the restrictions placed on the carriers' desires to purchase large military models. By the time this restriction was lifted, the high operating costs of helicopter service provoked the commercial carriers and military alike to demand larger capacity, more powerful and economical helicopters. The 1960's found the industry fulfilling this demand by providing twin-turbine powered helicopters. But, unfortunately, the manufacturing industry did not go much beyond improving the twin-turbine helicopters. Only two larger models were produced in later years and they were for military use. Operating costs still remained prohibitively high.

The most important point to remember in the helicopter airlines' development is the military's dominance of the helicopter industry. Because of the helicopter carriers' position of being a CAB experiment, expansion of that industry could not be considered until the service could prove that it could become self-sufficient. Consequently, the manufacturing industry catered to the military, its biggest and best customer, forcing the carriers to purchase commercial versions of military models that frequently did not suit the carriers' needs.

LAA, CHA, and NYA were eventually joined by San Francisco-Oakland Airlines in providing helicopter service. All four were similar in that they were locally oriented, providing service usually within a twenty-five mile radius of the center of their operations. In most cases, the most profitable route was between airports. Downtown service was limited by the lack of heliports or, when downtown heliports were available, their inconvenient location generally cancelled out the

benefits of a downtown location. Suburban service was costly and unprofitable because of the one-way traffic flows that resulted in the morning and evening hours. The helicopters operated by the companies were the same in every way but design. Only two manufacturing companies provided large commercial helicopters. Fares were relatively high compared to surface transportation, but this reflected the high costs of providing the service. The federally subsidized carriers--LAA, CHA, and NYA--charged lower fares because of the relative ease in obtaining the breakeven point as long as subsidies continued. SFO charged higher fares because it was without benefit of subsidies. Its fares reflected the actual costs of operations.

Washington Airways received CAB certification in 1968 but failed to exercise its authority because of its inability to obtain downtown heliport sites. It presently is seeking abandonment of its route. LAA has suspended service for a year while undergoing reorganization under the Bankruptcy Act. SFO is conducting helicopter operations under the same conditions. CHA and NYA are still in operation but the former is operating on a reduced scale from its peak in the late 1950's.

CHAPTER III

ECONOMIC PERFORMANCE EVALUATION

Introduction

The economic performance of the commercial helicopter passenger carriers, as in most business enterprises, can be measured in terms of their scale of operations, expenses, and revenues. These three aspects of a carrier's operations will be defined and measured in this chapter. Simultaneously, a comparison among the four certified carriers will be presented in table form with appropriate comments to provide a perspective of the level of operations performed by each carrier. Caution should be exercised in forming judgments as to the most successful carrier based on the data presented. Because each carrier's route structure and operating characteristics vary substantially from one another, such judgments would not be valid.

The structure and the methods of evaluation in this chapter are based on a report prepared by United Research Incorporated in December, 1963.[1] The report, in its entirety, appears in the testimony of hearings before the Senate Aviation Subcommittee in March, 1965, which has been cited numerous times in this paper.

---

[1]Report on the Outlook for Vertical-lift Aircraft in Scheduled Commercial Transportation prepared for the United Aircraft Corporation, the Boeing Company, and the General Electric Company; A. H. Nordling, Project Director (Cambridge, Mass.: United Research Incorporated, 1963), pp. III-1 to III-60.

Evaluation

The scale of operations of a carrier represents a measure of the degree of service offered to the public and the level of acceptability by the public of helicopter services. This measure is reflected in the amount of traffic growth--or lack of growth.

One measure of expanding traffic is the number of passenger originations. The CAB defines "passenger originations" as the number of revenue passengers boarding aircraft in scheduled service at the points of initial enplanement on the reporting carrier's system with the return portion of a round trip counted separately as an initial origination.[1] Passenger enplanements are the total number of revenue passengers boarding an aircraft, including originating and stopover or on line transfer passengers.[2] A revenue passenger is a person receiving air transportation from an air carrier for which remuneration is received by the air carrier.[3] Table 9 illustrates the number of annual passenger originations by carrier from 1953 when passenger service commenced until the close of 1970.

Another measure of traffic and the scale of operations is the number of revenue passenger miles flown by the carrier. A revenue passenger mile is simply one revenue passenger transported one mile in revenue service. It is computed by summation of the products of the revenue aircraft miles flown on each inter-airport hop multiplied by the number of revenue passengers carried on that hop.[4] Table 10 illustrates the trend experienced by the carriers.

---

[1]CAB, "Glossary of Air Transport Terms," Handbook 1969, p. 538.

[2]Ibid. [3]Ibid., p. 539. [4]Ibid.

TABLE 9

SCHEDULED PASSENGER ORIGINATIONS
(in thousands)

Year	Total	CHA	LAA	NYA	SFO
1953	1	-	-	1	-
1954	8	-	-	8	-
1955	29	-	5	24	-
1956	64	1	20	43	-
1957	153	55	30	68	-
1958	230	109	31	90	-
1959	366	204	42	120	-
1960	490	309	39	142	-
1961	430	245	41	144	-
1962	358	93	77	188	-
1963	458	50	167	241	-
1964	607	39	197	253	118
1965	719	32	243	306	138
1966	1067	-	307	527	233
1967	1220	-	394	537	289
1968	1041	-	306	408	327
1969[a]	744	5	165	254	320
1970[b]	573	13	62	268	230

[a,b]Passenger enplanements. Passenger originations not available.

Source: CAB, Handbook of Airline Statistics, 1963, 1969, 1970.

TABLE 10

REVENUE PASSENGER MILES
Scheduled Services
(in thousands)

Year	Total	CHA	LAA	NYA	SFO
1953	26	-	-	26	-
1954	183	-	3	180	-
1955	628	-	152	476	-
1956	1585	14	771	800	-
1957	3275	895	1124	1256	-
1958	4885	1991	1168	1726	-
1959	7477	3667	1476	2334	-
1960	9475	5202	1355	2918	-
1961	8604	4224	1507	2873	-
1962	8192	1703	2832	3657	-
1963	12510	1023	6706	4781	-
1964	16003	774	7985	5060	2184
1965	18811	597	9375	6170	2669
1966	25420	-	11530	9370	4520
1967	29670	-	14762	9556	5352
1968	24856	-	11369	7554	5933
1969	17023	78	6228	4812	5905
1970	11341	224	2336	4983	3798

Source: CAB, Handbook of Airline Statistics, 1963, 1969, 1970.

The data in both of the preceding tables reflects an overall rising trend in passenger demand and increased service by the helicopter carriers up until 1967 when traffic began to fall off.

CHA had the greatest rate of growth among the helicopter carriers until the unexpected shift of fixed-wing airline traffic from Midway to O'Hare Field in mid-1962 ruined CHA's most profitable route. Passenger originations declined drastically as a result of that situation, and revenue passenger miles dropped as well. New routes were not initiated to make up for the loss of traffic because of reduced federal subsidy revenues.[1] As was mentioned in Chapter Two, on December 31, 1965, CHA suspended operations until May 29, 1969.

LAA's decline in traffic and revenue miles flown from 1968 was due to at least three factors. In 1968 the carrier suffered two catastrophic S-61 accidents--one in May, and the other in August. Both accidents were similar in that it was believed that each helicopter lost a blade in flight, causing instant loss of control and death to the occupants upon impact with the ground. The accidents received nationwide publicity, causing a drop in passenger volume. In addition, the carrier is believed to have lost traffic to a number of short take-off and landing (STOL) equipped commuter airlines operating over LAA's routes.[2] Another factor was the overall sluggishness of the 1969 economy which affected airline travel in the country. Finally, LAA suffered a six month, ten day strike beginning in December, 1969,

---

[1]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 255.

[2]"S-61's Inspected; Carriers Resume Flights," Aviation Week, August 26, 1968, p. 29.

until May, 1970.[1]

NYA also suffered from the effects of LAA's accidents and the depressed economy.

SFO, the only non-subsidized operator, began passenger service in 1961, but because certificated operations did not begin until late 1963, operational data was not recorded until 1964. The carrier's traffic and revenue passenger miles increased steadily until 1969. The economy's slowdown and air traffic control delays that caused missed SFO connections were blamed by the carrier for the decline that year.[2] In addition, SFO was forced to gradually cut service to decrease expenses because of a deteriorating working capital situation.[3]

Growth of traffic in any segment of the transportation industry is related to the level of service provided. One measure of service is the number of available seat-miles offered by the carrier. An available seat-mile is the aggregate of the products of the aircraft miles flown on each inter-airport hop multiplied by the number of seats available on that hop. This represents the total passenger-carrying capacity offered.[4] As a clarification, seats available means the number of seats installed in an aircraft exclusive of any seats not offered for sale to the public by the carrier.[5] Table 11 indicates the increasing capacity

---

[1]"Los Angeles Airways Costly Strike Ends," Aviation Week, May 11, 1970, p. 27.

[2]Richard G. O'Lone, "New Management Retrenching at SFO," Aviation Week, February 23, 1970, pp. 39-40.

[3]"Helicopter Airline Files for Bankruptcy," p. 28.

[4]CAB, "Glossary of Air Transport Terms," Handbook 1969, p. 535.

[5]Ibid.

up until 1967. The year 1963 marks the full scale use of the large twin-engine helicopters.

The declining capacity suffered by LAA and NYA from 1968 on is indicative of reduced services brought on by conditions mentioned previously.

Increased capacity by itself, however, will not achieve economic self-sufficiency of an airline, be it fixed-wing or helicopter. This additional capacity must be purchased by more passengers to be productive. A measure of this productivity is the revenue passenger load factor. Defined as the percent that revenue passenger miles are of available seat-miles in revenue passenger service, it represents the proportion of aircraft seating capacity that is actually sold and utilized.[1] Table 12 presents this proportion.

It is readily apparent that the load factors parallel the trends in the tables. SFO's extreme drop in load factor in 1965 was due to delivery of Sikorsky S-61's while retaining their S-62's.

Total operating expenses are expenses incurred in the performance of air transportation. It is divided between direct aircraft operating expenses, and indirect operating and ground expenses.[2] Direct expenses are those involved in flying operations, direct maintenance, and flight equipment depreciation. On the other hand, indirect expenses include indirect maintenance, general services and administration (e.g., passenger service, promotion and sales, and aircraft and traffic servicing) and depreciation of other than flight equipment.

---

[1] Ibid., p. 539.

[2] Ibid., p. 538.

TABLE 11

AVAILABLE SEAT MILES
Scheduled Services
(in thousands)

Year	Total	CHA	LAA	NYA	SFO
1953	191	-	-	191	-
1954	716	-	41	675	-
1955	1708	-	749	959	-
1956	3561	63	1781	1717	-
1957	8136	2599	2181	3356	-
1958	11419	5343	2210	3866	-
1959	14628	7234	2615	4779	-
1960	18764	10286	2434	5504	-
1961	18276	10173	2753	5350	-
1962	20125	4817	7151	8157	-
1963	27657	2629	14588	10440	-
1964	34166	2154	16766	10328	4917
1965	41013	1763	18481	12023	9146
1966	51992	-	22730	15548	13714
1967	62041	-	29781	18479	31781
1968	59983	-	28909	14969	16105
1969	42962	38	17956	8712	16256
1970	31700	391	8280	11684	11425

Source: CAB, Handbook of Airline Statistics, 1963, 1969, 1970.

TABLE 12

REVENUE PASSENGER LOAD FACTOR
Scheduled Services

Year	Total	CHA	LAA	NYA	SFO
1953	13.6%	- %	- %	13.6%	- %
1954	25.6	-	7.3	26.7	-
1955	36.8	-	20.3	49.6	-
1956	44.5	22.2	43.3	46.6	-
1957	40.3	34.4	51.5	37.4	-
1958	42.8	37.3	52.9	44.6	-
1959	51.1	50.7	56.5	48.8	-
1960	50.5	48.1	55.7	53.0	-
1961	47.1	41.5	54.7	53.7	-
1962	40.7	35.4	39.6	44.8	-
1963	45.2	38.9	46.0	45.8	-
1964	46.8	35.9	47.6	49.0	44.4
1965	45.4	33.9	50.7	51.3	29.2
1966	48.9	-	50.7	60.3	33.0
1967	47.8	-	49.6	51.7	38.8
1968	41.5	-	39.3	50.7	36.8
1969	39.9	43.8	35.0	55.2	36.3
1970	35.7	57.3	28.2	42.6	33.2

Source: CAB, Handbook of Airline Statistics, 1963, 1969, 1970.

One measure of an airline's unit costs is that of total operating cost per available ton-mile. Operating expense or cost has been previously defined. An available ton-mile is the aggregate of the products of the aircraft miles flown on each inter-airport hop multiplied by the available aircraft capacity measured in tons (instead of seats as in available seat-mile) for that hop. It represents the traffic-carrying capacity offered.[1] A ton would include passengers, cargo, and mail. Table 13 provides an insight into the trends in operating expenses per available ton-mile.

It is apparent that total operating expenses have gradually declined since turbine equipment was introduced in 1962. However, to put this cost per available ton-mile in perspective, local service carriers (known as "feeder lines") have a far less expensive rate. Taking three years in the period when helicopter costs were the least expensive, local service carrier total costs per available ton-mile were .475, .460, and .398 cents in 1963, 1965, and 1967, respectively.[2]

Table 14 provides information on the direct operating expense per available ton-mile. Just as total operating expense has come down since 1953, so, too, has total direct operating expense declined. But, again, when the helicopter carriers' direct operating expense is compared to the longer range and larger carrying capacity local service carriers, the tremendous expense of helicopter operations is revealed. In a five year period, the total direct operating expense per available ton-mile on scheduled local service carriers steadily declined from .227 cents in

---

[1]Ibid., p. 535.

[2]CAB, Handbook of Airline Statistics, 1970.

TABLE 13

TOTAL OPERATING EXPENSES PER AVAILABLE TON-MILE
(All Services)

Year	Total	CHA	LAA	NYA	SFO
1953	$6.746	$6.764	$5.087	$8.555	-
1954	6.766	6.913	4.779	8.753	-
1955	6.762	6.779	4.384	10.000	-
1956	6.380	7.814	3.950	9.090	-
1957	4.817	3.885	3.916	6.339	-
1958	3.980	2.673	3.872	6.156	-
1959	4.042	2.911	3.796	5.985	-
1960	3.762	2.659	4.272	5.760	-
1961	4.034	2.717	4.227	6.438	-
1962	3.793	3.194	2.817	5.223	-
1963	2.917	3.834	1.879	4.227	-
1964	2.828	4.246	1.772	4.463	2.550
1965	2.675	4.514	1.645	4.118	2.553
1966	2.914	-	1.557	5.017	2.376
1967	2.720	-	1.546	4.891	2.025
1968	2.640	-	1.793	4.481	2.091

Source: CAB, Handbook of Airline Statistics, 1963, 1969.

1964 to .168 cents in 1968.[1] This contrasts drastically with the varying $1.00 plus figure in the same period for helicopter carriers.

[1]CAB, Handbook of Airline Statistics, 1970.

TABLE 14

DIRECT OPERATING EXPENSES PER AVAILABLE TON-MILE
Scheduled Services

Year	Total	CHA	LAA	NYA	SFO
1953	$4.213	$3.955	$2.608	$5.007	$ -
1954	3.863	3.782	3.116	4.670	-
1955	3.625	3.323	2.633	5.108	-
1956	3.223	3.827	2.280	4.257	-
1957	2.534	2.203	2.122	3.143	-
1958	2.150	1.600	1.984	3.151	-
1959	2.238	1.700	1.810	3.365	-
1960	2.102	1.632	1.946	3.157	-
1961	2.102	1.552	1.845	3.304	-
1962	1.873	1.590	1.441	2.517	-
1963	1.433	1.662	1.039	2.000	-
1964	1.450	2.006	.993	2.164	1.355
1965	1.331	1.889	.883	2.009	1.266
1966	1.083	-	.849	1.945	1.264
1967	1.386	-	.813	2.553	1.107
1968	1.281	-	.962	2.143	1.084

Source: CAB, Handbook of Airline Statistics, 1963, 1969.

With the costs of operations discussed, the other side of the coin--revenues--should be mentioned.

In the beginning stages of development, passenger revenue yields covered only a small portion of the costs of producing a passenger mile of traffic. But under the influence of an increased scale of operation as evidenced by passenger originations up until 1967 and the improved economic performance of the turbine helicopter, the cost/yield relationship has shown a substantial decline. But there is still an urgent need to improve this relationship. Table 15 compares the total operating cost per passenger mile with revenue yield per passenger mile. This table readily shows the reason why subsidy assistance has been needed by helicopter carriers since 1957. In every year, except one, the costs per revenue passenger mile exceed revenue yields per revenue passenger mile in a range from six cents to $1.30. The one exception is SFO in 1966 when revenue yield exceeded costs by one cent.

To a certain extent Table 15 overstates the subsidy need in that it considers only passenger revenue yields. In the early years of operations, the carriage of mail and cargo was a substantial portion of non-subsidy revenue. Nevertheless, the relationship between passenger revenue yield and cost is the most significant because the commercial helicopter carrier's role in the national transportation system is one of meeting passenger needs.

One important point that should be apparent is the much improved yields per revenue passenger mile since 1957. Again, this was due to the more efficient twin-turbines with increased capacity.

A final observation of the need for subsidy assistance can be seen in Table 16 which compares transportation revenue and total

TABLE 15

COMPARISON OF TOTAL OPERATING COST PER PASSENGER MILE AND REVENUE YIELD PER PASSENGER MILE (in cents)

Year	Total			CHA			LAA			NYA			SFO		
	Cost	Yield	Diff.	Cost	Yield	Diff.	Cost	Yield	Diff.	Cost	Yield	Diff.	Cost	Yield	Diff.
1957	158	30	128	160	30	130	105	16	89	203	41	162	-	-	-
1958	122	30	92	98	31	67	104	16	88	162	38	124	-	-	-
1959	95	31	64	68	33	35	91	17	74	140	37	103	-	-	-
1960	88	33	55	65	35	30	106	17	89	122	36	86	-	-	-
1961	102	32	70	77	34	43	104	16	88	140	38	102	-	-	-
1962	108	31	77	120	31	89	84	17	67	121	41	80	-	-	-
1963	71	32	39	133	30	103	46	21	25	92	47	45	-	-	-
1964	64	36	28	160	49	111	41	23	18	91	49	42	53	47	6
1965	50	38	12	180	69	111	35	24	11	80	47	33	76	60	16
1966	59	49	10	-	-	-	32	22	10	83	50	33	64	65	+1
1967	58	39	19	-	-	-	32	23	9	95	57	38	53	43	10
1968	65	43	23	-	-	-	47	21	26	91	62	29	58	44	14

Source: CAB, Handbook of Airline Statistics, 1963, 1969.

TABLE 16

DIFFERENCE BETWEEN TRANSPORTATION REVENUE AND TOTAL OPERATING COST
(Thousands of dollars)

Year	Total			CHA			LAA			NYA			SFO		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
1957	1405	5164	(3759)	349	1430	(1081)	385	1179	(794)	671	2555	(1884)	-	-	-
1958	1872	5963	(4091)	677	1952	(1275)	396	1216	(820)	799	2795	(1996)	-	-	-
1959	2795	7110	(4315)	1257	2504	(1247)	499	1344	(845)	1039	3262	(2223)	-	-	-
1960	3665	8382	(4717)	1869	3388	(1519)	558	1440	(882)	1238	3554	(2316)	-	-	-
1961	3335	8807	(5472)	1481	3236	(1755)	566	1560	(994)	1288	4011	(2723)	-	-	-
1962	3051	8835	(5784)	564	2040	(1476)	803	2381	(1578)	1684	4414	(2730)	-	-	-
1963	3964	8839	(4875)	307	1365	(1058)	1429	3061	(1632)	2227	4413	(2186)	-	-	-
1964	5694	10295	(4601)	377	1240	(863)	1803	3295	(1492)	2495	4584	(2089)	1019	1176	(157)
1965	7173	11369	(4196)	411	1079	(668)	2238	3300	(1062)	2916	4951	(2035)	1608	2037	(429)
1966	10484	14929	(4445)	-	-	-	2558	3667	(1109)	4819	7757	(2938)	2661	2909	(248)
1967	11602	17249	(5647)	-	-	-	3404	4756	(1352)	5452	9034	(3582)	2320	2833	(513)
1968	10568	16177	(5609)	-	-	-	2890	5395	(2505)	4681	6882	(2201)	2588	3413	(825)

Code: (1) Transport Revenue; (2) Total Operating Cost; and (3) Difference.

Source: CAB, Handbook of Airline Statistics, 1963, 1969.

operating costs of the helicopter industry and each carrier. As in Table 15, 1957 is the beginning year because that was the first full year of passenger operations for the three original carriers.

In this table, no helicopter carrier reached the breakeven point in its operations. The smallest consistent spread between revenues and expenses was experienced by the non-subsidized SFO.

Factors Affecting Economic Performance

From the preceding discussion of scheduled helicopter operations, it is apparent that it is a high cost operation. There are several reasons why this is so.

Scheduled helicopter passenger service is basically a short-haul operation. The average stage length in 1965 was eighteen miles compared to 100 miles for local service carriers. In the air transportation industry, short-haul operations are the most expensive to perform. Two factors account for this situation. Wear and tear is increased substantially because of the more frequent landings and take-offs. This shortens the lift of many parts on the helicopter and more frequent maintenance is required. Another reason for the expense of short-haul operations is the frequent ground time incurred in loading and unloading the aircraft, in addition to preparing and clearing for take-off. This results in lower utilization of the equipment than if it were airborne for longer stage lengths as in fixed-wing aircraft. Low utilization tends to increase costs.[1]

Another problem in helicopter operations is the high maintenance costs incurred by the carriers. This is caused by the almost

---

[1]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 42.

constant motion of the helicopter's parts. Unlike the fixed-wing aircraft where lift is achieved by the smooth airflow across its stationary wing, the helicopter must achieve both its lift and forward motion through its constantly rotating rotor. Not only is the rotor moving continually, but components such as the gear boxes, transmissions, drive shafts, rotor heads, and blades are in continual motion. Obviously, this causes stress which requires more frequent inspections and overhaul maintenance than fixed-wing aircraft.[1]

In addition, helicopter engines operate at almost top speed during a large portion of their flight which means increased fuel consumption and engine stress. A fixed-wing aircraft's engine would operate at maximum power only during take-off. Another source of wear and tear is that the helicopter itself is operating at close to its maximum airspeed. All these factors combine to increase the maintenance costs of the helicopter. In 1963 the average maintenance costs, including direct maintenance and maintenance burden, for two engine, fixed-wing piston aircraft in local service operation was thirty-five cents per aircraft mile. But the piston helicopter and turbine-powered helicopter cost an average $1.01 and $1.89 per mile, respectively.

The Future Possibility of an Economic Helicopter

A student seeking information on the future of the pure helicopter is likely to be confronted with varying opinions. Some sources express the opinion that there is no future for the aircraft while others feel that it is about to reach a new height in its development.

---

[1]Ibid.

These positions will be presented in the following paragraphs. In addition, other methods of air transportation that are likely to compete with the helicopter in the future will be discussed.

Fortune magazine, in an article featuring the helicopter manufacturing industry, felt that vertical and short take-off and landing (V/STOL) aircraft were the only answer to the high operating costs of the helicopter. It felt that under the right conditions, airport feeder lines utilizing sixty-passenger commercial versions of Sikorsky's S-61 or Vertol's V-107 could compete profitably with surface taxis. But their two million dollar purchase price was extremely high. Also they would have to be kept flying on a heavy schedule to spread the indirect operating expense and to provide service frequent enough to attract sufficient traffic. Despite the magazine's claim that the service could compete profitably with the taxi, it felt that "few, if any, heliports would generate sufficiently heavy traffic of affluent passengers for such a schedule." They concluded that the potential market was not large enough for the manufacturer to recover the costs of converting their present models to larger versions.[1]

New developments in aviation engineering have placed the helicopter in a family of types that have similar operating characteristics. The term "helicopter" is being classified more broadly as vertical take-off and landing (VTOL) aircraft.[2] "VTOL aircraft are those capable of ascending or descending vertically, with a capability of remaining fixed

---

[1]Philip Sickman, "The Big New Whirl in Helicopters," Fortune, April, 1966, pp. 210-14.

[2]"Civil Helicopter Total May Double by 1971," Aviation Week, March 7, 1966, p. 290.

with no vertical or horizontal movement, commonly referred to as a hover."[1] VTOL's possess a greater potential for an increased hourly utilization because they require less non-productive air and ground maneuvering time. This advantage reduces costs over short hauls and reduces terminal congestion because a VTOL aircraft can approach or depart from any direction. The main disadvantage in VTOL aircraft is that at this time a suitable commercially viable vehicle does not exist. All are on the drawing or in a limited testing phase.[2]

VTOL aircraft are classified into three categories: rotor driven, propeller driven, and jet lift. This discussion will be restricted to rotor driven aircraft. Rotor driven VTOL's include the pure helicopter which is in service today. The preceding discussion on the operating expenses incurred by helicopter operations indicates that this aircraft is not yet an economically sound machine. Engineering limitations, such as the high power needed for wingless lift with resultant high fuel consumption, are one reason for its economical unsoundness.[3]

Compound helicopters are classified as rotor driven also. These aircraft utilize a separate forward propulsion system in addition to the main rotor overhead as in the pure helicopter. A small wing is added to the fuselage to transfer lift from the rotor to the wing as the aircraft's speed increases. The compound helicopter's speed is greater than

---

[1] U.S., CAB, "Planning Study STOL-VTOL Air Transportation Systems," (unpublished report prepared by Carl Hintze, Jr., Bureau of Economics, 1970), p. 9.

[2] Ibid., p. 11.

[3] Ibid., p. 12.

the pure helicopter but it is limited by the rotor.[1]

The stopped/stowed rotor concept is the third type of rotor driven aircraft and it is an attempt to overcome the limitations of the compound helicopter. This concept involves completely stopping the rotor at some particular forward flight speed. Once stopped, the aircraft is accelerated to a higher cruise speed with lift provided by the wing and the stationary rotor blades. Areas of concern with this type of aircraft are the distortion of the rotor blades and aircraft handling qualities. The stowed rotor concept finds the aircraft taking off as a compound helicopter and then, at a speed greater than the stall speed of the wing, the rotor is stopped, folded, and retracted into the fuselage to convert to conventional wing configuration. Both concepts require a considerable amount of mechanical and aerodynamic development before they can be considered for application to operational commercial aircraft.[2]

These are a few of the different types of VTOL aircraft that could replace today's uneconomical helicopter. But there are some who believe that the pure helicopter still has an important role to play in air transportation. Rapid progress in VTOL technology since the introduction of turbine service and the knowledge derived from Vietnam-induced research and development promise fast, convenient, and economical short-haul transportation. Decreased engine weight and fuel consumption are expected to result from the application of advanced technology. The specific weights of the helicopter's rotor systems have been improved upon in recent years, and further future improvements will be mainly

---

[1] Ibid.

[2] Ibid., pp. 12-13.

due to the introduction of advanced materials such as boron and graphite filament composites into blade construction. Major improvements in structural strength have evolved because of the high strength and stiffness of advanced fiber-reinforced composite materials.[1]

VTOL design trends can be grouped into five classes. Class One consists of the present Sikorsky S-61 and Vertol 107 twenty-five passenger helicopters. Their shortcomings are poor economics, low passenger appeal, inadequate schedule reliability, and the lack of Instrument Flight Rule (IFR) capability on take-off and landings on helipads.[2]

Class Two aircraft consists of thirty-seat versions of the Class One helicopters with small improvements in economics, performance, and reliability.[3] Class Three vehicles consist of fifty to seventy-five seat helicopters derived from the current CH-46, CH-53, and CH-64 military models. Their economics, performance, and reliability are superior to the two former classes.[4]

Class Four consists of ninety to 100-seat helicopters specifically designed for the commercial market of the 1970's. It is estimated that their direct operating costs match that of the fixed-wing DC-9 and 737 jets at ranges from fifty to one hundred miles. These large vehicles would make possible a profitable large-scale VTOL operation. Their reliability would be equal to current jets and vibration levels would be

---

[1]Report of the Transportation Workshop, 1967, on Air Transportation 1975 and Beyond: A Systems Approach, Bernard A. Schiever and William W. Seifert, co-chairmen (Cambridge, Mass.: The M.I.T. Press, 1968), pp. 226-30.

[2]*Ibid.*, p. 230. [3]*Ibid.*

[4]*Ibid.*, p. 235.

acceptable. IFR capability on helipad operations would be available.[1]

Class Five vehicles would be comprised of compound helicopters, tilt wings, tilt rotors, stowed rotors, fan-in-wing, and propulsive wing. The tilt-wing and tilt-rotor is expected to have the lowest direct operating costs of all VTOL's.[2]

Clearly, economical helicopters can be developed provided that there is a market for such aircraft and there are funds available for continued research. But despite the current interest in the Northeast Corridor transportation segment between Washington, D.C. and Boston, Massachusetts, that would provide a ready short-haul market for VTOL aircraft, funds are lacking. The first federal contract award to a helicopter company in six years was recently granted the Vertol Division of the Boeing Company for further research on a heavy lift helicopter.[3] No other federal funds have been provided.

Summary

Scheduled helicopter service grew almost continually since its beginning in 1953. This is reflected in the rise of the total number of passenger originations and total revenue passenger miles flown by the scheduled helicopter carriers. This growth continued until 1968 when LAA suffered two disastrous helicopter accidents that affected the whole commercial helicopter industry. Since then, passenger originations and total revenue passenger miles flown have declined.

---

[1]*Ibid.*, p. 235.

[2]*Ibid.*

[3]"Vertol Wins Heavy Lift Helicopter," *Aviation Week*, May 17, 1971, p. 21.

Total available seat miles in scheduled helicopter service grew steadily since 1953 as larger capacity helicopters replaced older models. The dramatic increase in 1963 was due to the introduction of Sikorsky's and Vertol's twin-turbine helicopters that doubled the capacity of previous helicopters. Again, a decline set in in 1968 when reduced operations were brought on by rising costs and declining patronage.

The total revenue passenger load factor varied from year to year in the forty to fifty percent range for the most part. However, reduced patronage of the helicopter services can be seen in 1968, 1969, and 1970 when load factors began to decline to the upper thirties.

Total operating expenses and total direct operating expenses per available ton-mile indicate an almost steady decline from 1953. In that year total operating expenses declined from $6.75 to $2.64 in 1968. Direct operating expenses declined from $4.21 to $1.28 in the same period. This reduction in operating expenses reveals an improvement in operating knowledge of helicopter operations and a tremendous improvement in the helicopters themselves. Introduction of the twin-turbine helicopters in 1960-1961 resulted in a momentary increase in expenses because of operational problems with the new equipment, but once they were resolved, expenses declined sharply in 1963.

Even though expenses declined in the scheduled helicopter industry, they were still too high in comparison with fixed wing aircraft operated by the local carriers. Where total helicopter operating expenses were in the $2.65 to $2.95 range in the 1960's, local service carriers were incurring total costs of forty to fifty cents. Direct operating costs of helicopter equipment from 1964 to 1968 was more than a dollar per available ton-mile, while the local carriers were incurring

expenses of seventeen to twenty-three cents.

The economic picture of commercial helicopter passenger service is revealed in the comparison of total operating costs per passenger mile and the revenue yield per passenger mile. Improved helicopter models have generally reduced costs while at the same time improving the yields. But still the difference between yield and cost has been a negative figure since 1957, except for SFO who managed to post a one-cent gain in 1966. The lowest negative difference achieved was ten cents in 1966. The widest difference occurred in 1957 when the spread between total cost per passenger mile and yield per passenger mile was $1.23.

The economic picture also is revealed when the difference between transportation revenue and total operating cost is measured. Without federal subsidies, total costs exceeded total transportation revenues in every year from 1957--ranging from a low of $3,759,000 in 1957 to a high of $5,784,000 in 1962.

Clearly, commercial helicopter passenger service is not an economically viable venture with the present equipment. Costs of operation far exceed passenger revenues.

CHAPTER IV

THE CIVIL AERONAUTICS BOARD'S ROLE

Origin

The Air Commerce Act of 1926 was the initial federal law regulating civil aviation in the United States. It directed the Department of Commerce to promote air transportation by encouraging the development of airport, civil airways, and navigational facilities. The Act's emphasis was on fostering safety in civil aviation.[1]

The Post Office Department's role in aviation at this time was considerable, in that it was responsible for its initial development. It exercised what little economic regulation there was by issuing equipment and operating requirements for mail contract awards.[2] But early in 1934, the Post Office Department canceled all air mail contracts existing at that time, on the grounds that the original air mail awards had been issued out through a collusive spoils system instead of according to proper competitive bidding as intended. An attempt by the Army to fly the mail proved to be costly and plagued by accidents and it was soon terminated.[3]

---

[1]Joseph L. Nicholson, Air Transportation Management (New York: John Wiley & Sons, Inc., 1951), p. 146.

[2]Ibid.

[3]Richard E. Caves, Air Transport and Its Regulators (Cambridge, Mass.: Harvard University Press, 1962), p. 123.

Because of this situation, the Air Mail Act of 1934 was developed and sanctioned by the Congress. The competitive bidding process for air mail routes was revised and responsibility for public control of the air-transport business was divided among three governmental agencies. The Interstate Commerce Commission was responsible for establishing the rates of mail pay for each route. The Bureau of Air Commerce, a new agency founded by the Air Mail Act, was in charge of safety and technical regulation.[1]

The third responsible party was the Post Office Department. It awarded contracts for air mail service and decided the routes and schedules that the carriers should fly. It retained its economic control over the air industry in that it controlled entry into the industry ". . . since air-passenger travel was then in its infancy and a successful business operating without a subsidized air-mail contract was impossible."[2] This situation was no less true in 1947 for the helicopter air transport industry. Because helicopters in that period were not capable of providing profitable passenger service, a helicopter operator could only gain entry into the industry by the award of an air mail contract.

By 1935, the shortcomings of the Air Mail Act were apparent to all, including the three agencies. The division of responsibility among the three had overlapping conditions that made administration difficult. And there was a loophole in the competitive bidding process. The Federal Aviation Commission, founded by the Air Mail Act to make policy recommendations, made an intensive study in 1935 and recommended that a single

---

[1] Ibid., p. 124.

[2] Ibid.

agency should be responsible for the regulation of the air transport industry. Rivalry among the governmental departments over who should be granted these sole powers as recommended by the Commission delayed action for three years.[1] On June 23, 1938, the Civil Aeronautics Act of 1938 was passed by the Congress and signed by President Franklin D. Roosevelt.[2]

The Civil Aeronautics Act of 1938 as amended remains the primary statute governing public control of civil aviation in the United States. The Federal Aviation Commission's recommendation of the establishment of a single authority to govern civil aviation was realized by this Act by the creation of the Civil Aeronautics Authority. The Authority was composed of five members who were appointed by the President with the advice and consent of the Senate. Their term of office was six years, and not more than three members were to be appointed from the same political party. The Civil Aeronautics Authority was comparable to the Interstate Commerce Commission in that both were intended to be independent regulatory agencies, free from executive interference.[3]

In 1940, by executive order of the President, a reorganization of the Authority took place. A Civil Aeronautics Administration was established and placed under the responsibility of the Department of Commerce. Its function was the development of physical facilities for air navigation, administration of safety regulations (but not the

---

[1] Ibid., pp. 124-25.

[2] D. Philip Locklin, Economics of Transportation (Homewood, Ill.: Richard D. Irwin, Inc., 1966), p. 790.

[3] Ibid.

prescription of safety rules and standards) and civilian pilot training programs, and the issuance of aircraft, airmen, and other certificates required in the interest of safety.[1]

In addition, the Civil Aeronautics Authority became the Civil Aeronautics Board with all the former organization's previously mentioned characteristics. The CAB was concerned with the economic regulation and promotion of the air transportation industry or "the business of transporting persons, property, and mail by air . . ." Except for the task of prescribing safety rules and standards, the CAB was not concerned officially with the safety aspects of aviation. Despite the 1940 reorganization and contrary to the Civil Aeronautics Administration's subordination to the Secretary of Commerce, the CAB maintained its independence as a regulatory agency.[2]

The final change that brings the civil aviation governmental bureaucracy up to the present took place in 1958. In that year, the Federal Aviation Act created the Federal Aviation Agency (now known as the Federal Aviation Administration under the Department of Transportation) to replace the Civil Aviation Administration and to assume its functions. The power to prescribe safety rules and standards, previously held by the CAB, was assumed by the Federal Aviation Agency, making that agency responsible for all matters pertaining to air safety in the United States. The Act's impact upon the CAB was that it reconfirmed and reinforced the continuation of that independent agency as the regulatory agency and re-enacted without substantial change the provisions of the

---

[1] Ibid., pp. 793-94.

[2] Ibid.

Civil Aeronautics Act of 1938 relating to economic regulation.[1]

Regulation of Air Service by the CAB

The general policy the CAB is required to follow in the performance of its duties was specifically stated and recorded by the Congress in the Civil Aeronautics Act of 1938. Its importance in understanding the CAB's regulatory function merits its quotation:

Declaration of Policy

> In the exercise and performance of its powers and duties under this Act, the Board shall consider the following, among other things, as being in the public interest, and in accordance with the public convenience and necessity.
>
> (a) The encouragement and development of an air transportation system properly adapted to the present and future needs of the foreign and domestic commerce of the United States, of the Postal Service, and of the national defense;
>
> (b) The regulation of air transportation in such a manner as to recognize and preserve the inherent advantages of, assure the highest degree of safety in, such transportation, and to improve the relations between, and coordinate transportation by, air carriers;
>
> (c) The promotion of adequate, economical, and efficient service by air carriers of reasonable charges, without unjust discriminations, undue preferences or advantages, or unfair or destructive competitive practices;
>
> (d) Competition to the extent necessary to assure the sound development of an air-transportation system properly adapted to the needs of the foreign and domestic commerce of the United States, of the Postal Service, and of the national defense;
>
> (e) The promotion of air safety in air commerce; and
>
> (f) The promotion, encouragement, and development of Civil Aeronautics.[2]

Titles IV and X of the Civil Aeronautics Act contain the detailed features of air-carrier economic regulation. A brief description of each

---

[1]*Ibid.*, p. 797.

[2]Caves, *Air Transport and Its Regulators*, p. 126.

section in Title IV that relates to this study and provides some understanding of the CAB's role in commercial helicopter passenger service development is mentioned in the following paragraphs.

Section 401 states that no air carrier shall operate in interstate commerce without a certificate of convenience and necessity. Applications for such certificates are to be granted if the CAB finds "that the applicant is fit, willing, and able to perform such transportation properly, and to conform to the provisions of this Act and the rules, regulations, and requirements of the Board hereunder, and that such transportation is required by the public convenience and necessity."[1] The important criteria by which the CAB must determine whether a particular proposal is in the public interest is based on the present and future needs of the commerce of the United States, the postal service, and the national defense. If the proposed service is believed to be important to postal requirements or national defense, cost is of secondary importance.[2]

Section 403 requires that carriers establish and adhere to rates in such form as the CAB prescribes. The rates must be filed with the CAB and made available for public inspection.[3]

Section 404 grants comprehensive authority to the CAB to reject, modify, or revise fares.[4] The CAB must consider at least three factors in determining a just fare: ". . . effect on the movement of traffic,

---

[1]Ibid., pp. 127-28.

[2]Nicholson, Air Transportation Management, p. 155.

[3]Caves, Air Transport and Its Regulators, p. 128.

[4]Ibid., pp. 128-29.

the public interest in securing transportation at the lowest possible cost, and the carrier's need for revenues sufficient to provide adequate service under honest, economical, and efficient management."[1]

Section 406 directs the CAB to fix fair and reasonable rates for the carriage of mail by aircraft. In deciding the proper mail rate, CAB is directed to consider the need of each air carrier for mail compensation "sufficient to insure the performance of such service and together with all other revenue of the air carrier to enable such air carrier under honest, economical and efficient management to maintain and continue the development of air transportation . . ." in the United States.

This mail rate provision is the means by which the CAB is able to financially assist a carrier and, thus, encourage the development of an air system in the interest of the commerce of the United States, the postal service, and the national defense. This provision also authorizes the CAB to increase mail rates to pay for a carrier's losses incurred in non-mail services to insure the delivery of the mail. Another requirement of Section 406 calls for the carriers to periodically submit operating, traffic, financial, and other reports to the CAB.[2]

Section 408 lists various types of transactions between specified classes of persons which are unlawful in the absence of CAB approval. These transactions relate to mergers of air carriers and acquisition of control of air carriers by other carriers.[3]

---

[1]Nicholson, Air Transportation Management, pp. 158-59.

[2]Ibid., p. 159.

[3]Ibid.

Section 409 makes unlawful interlocking relationships between air carriers and other common carriers or persons engaged in any phase of aeronautics or persons whose principal business is the holding of stock in or controlling an airline, or any other person engaged in any phase of aeronautics, without the consent of the CAB.[1]

Section 416, the final provision of Title IV, authorizes the CAB to classify carriers, make rules and regulations for each class, and also to exempt from any or all requirements of the title any carrier or class of carriers for whom enforcement would be an undue burden because of the limited extent of, or unusual circumstances affecting, the operations of a carrier.[2]

Subsidies

A section devoted to a brief discussion of subsidies is important to any study of airline history. This financial support enabled the air transportation industry to overcome the initial costs of operation until they became self-sufficient and self-supportive.

Subsidies are particularly important when discussing helicopter service because its existence fostered the commercial helicopter's birth and its deletion spelled disaster for this industry in most cases.

This section is divided into two parts. First, a discussion of the general subject of subsidies, how it evolved, and the procedures necessary to obtain a subsidy will be presented. The last part will be devoted to subsidies in relation to the helicopter industry; particularly, the controversy that arose when the subsidy came under Congressional scrutiny in the early 1960's.

---

[1] Ibid., p. 161.

[2] Caves, Air Transport and Its Regulators, p. 133.

Subsidies in General

The significance of Section 406 of the Civil Aeronautics Act of 1938 in relation to subsidies has been cited earlier. By the terms of that section, subsidy payments have always been handed to the air carriers in association with payments for carrying mail. Prior to the 1938 Act, the Post Office was directly in charge of buying the services of commercial aviation with a free hand in the amount of subsidy to be given. After 1938, the system persisted with appropriations from the Post Office including whatever volume of subsidy the CAB decided to grant.[1]

The justification for subsidy payments by the CAB was based on three parts of Section 406. Section 406(a) states that the CAB shall fix fair and reasonable rates of compensation for the transportation of mail by aircraft. Section 406(c) further states that the compensatory (known also as service mail) portion of such compensation shall be paid by the Post Office Department on the basis of rates established by the CAB for that purpose. And Section 406(b) stipulates that the remainder of the total mail compensation (or the subsidy portion) shall be paid by the CAB "in order to further and promote the development of air transportation to the extent and of the quality required for the commerce of the United States, the postal service, and the national defense."[2]

Once a carrier receives a certificate to carry mail, provision of mail pay, including subsidy, is provided until the certificate expires. The subsidy consists of an amount to cover the carrier's

---

[1] Ibid., p. 254.

[2] Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 53.

operating loss "incurred under honest, economical, and efficient management," and to provide it an opportunity to earn a fair return (after taxes) on the investment used.[1]

The initiation of subsidy cases was normally begun by the carrier filing a petition with the CAB. The amount of subsidy granted to a carrier was normally the sum of:

1) the carrier's break-even need for a forecast 12-month period (e.g., the excess of expenses over revenues);

2) the capital cost for a fair return; and

3) income taxes.

Subsidy is paid on a monthly basis by the CAB.[2]

The subsidy rates established by the CAB offered only an opportunity for a carrier to earn a profit, but they did not guarantee it. Because the rates were "closed," meaning that the subsidy was fixed at an absolute amount over an indefinite future period,[3] losses incurred by the carriers in past years could not be made up with a subsidy in fixing future rates. This policy, it was felt, encouraged carrier management to improve their operations to achieve better earnings because under the closed rate he bore the risk of losses.[4]

In establishing a subsidy rate, the CAB's procedures provided for a detailed analysis of each carrier's

1) reasonableness of capacity operated;

2) reasonableness of costs;

---

[1]Ibid.

[2]Ibid.

[3]Caves, Air Transport and Its Regulators, p. 255.

[4]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 53.

3) proper investment base to be recognized for rate purposes and the related fair return; and

4) amount of revenue to be recognized for rate purposes.[1]

The carrier's subsidy petition must include a twelve-month forecast of operations upon which the subsidy claim is based. Any clarifications needed or claims not substantiated prompt a CAB request for additional information.[2]

Helicopter Subsidies

It is apparent from what has been written in Chapter Two and in this chapter that the CAB's role in commercial helicopter passenger service development was that of promotion. With the Congress' Declaration of Policy as its mandate and the legal authority of Section 406, Title IV, of the Civil Aeronautics Act of 1938, the CAB made a sustained effort to support the helicopter industry. Through substantial annual subsidies from 1947 to 1965, it was hoped that commercial service could be kept active until an economical helicopter of sufficient capacity would come on the market to make the service self-supportive and profitable.

Table 17 reveals the total annual revenues and the total annual subsidy the helicopter group received since 1954 and the percentage the subsidy was of total revenues.

The twelve-year period recorded in Table 17 shows a gradual decline in the percentage of subsidies to total overall revenues. In the later years this was due to a combination of increasing total overall revenues and the gradual Congressional curtailment of subsidy funds.

---

[1] _Ibid._

[2] _Ibid._

The total subsidy granted the helicopter group amounted to $49,867,000 over the twelve years, and this was 57.6 percent of total overall revenues in that time span.

TABLE 17

SUBSIDY PERCENTAGE OF TOTAL REVENUES
(in thousands)

Year	Total Overall Revenues	Total Subsidy[a]	Subsidy Percentage of Revenues (percentage)
1954	3,071	2,663	86.7%
1955	3,356	2,711	80.7
1956	3,711	3,142	84.6
1957	5,032	4,184	83.1
1958	6,291	4,625	73.5
1959	7,760	4,949	63.7
1960	8,601	5,118	59.5
1961	8,603	5,667	65.8
1962	8,583	5,502	64.1
1963	8,637	4,640	53.7
1964	10,174	4,300	42.2
1965	11,135	2,366	21.2
Totals	85,994	49,867	57.6

[a]Total Subsidy does not include service mail pay.

Source: CAB, Handbook of Airline Statistics.

The anti-helicopter subsidy movement began in the House Appropriations Committee's Independent Offices Subcommittee under the leadership of Rep. Albert Thomas (D-Texas) in June, 1961, when the Fiscal Year 1962 budget was before the Congress. For four years a battle for the subsidy funds was waged by CAB Chairman Alan S. Boyd, who found it increasingly difficult to receive what he requested.

After fifteen years of granting subsidies, which culminated in the highest annual subsidy of $5,667,000 in 1961, there was some fear in the House that the subsidy would continue indefinitely. In that year, the House began curtailing funds with the goal of eliminating the subsidy entirely in Fiscal Year 1963. It was recommended by the House that the subsidy be limited to five million dollars in Fiscal Year 1962 and eliminate the subsidy in Fiscal Year 1963. The CAB chairman went to the other extreme, stating that helicopter subsidy needs would "peak out" at eight million dollars in Fiscal Year 1963 and decline to five million by 1966.[1]

Chairman Boyd had a more receptive ear in the Senate, as was to be the case in the following years. The argument that subsidy reductions would prevent breakthroughs in helicopter development, especially since the helicopter airlines were in the process of just receiving twin-engine turbines that promised more economic performance, was readily understood by that legislative body. Without funds to get the airlines through the expected initial high cost phase of their introduction, the fifteen year experiment in helicopter transportation would fail just before it had the first possibility that it would succeed. The Senate

---

[1]"Helicopter Lines Face Pressure on Subsidy," Aviation Week, June 19, 1961, p. 41.

restored a substantial portion of the subsidy amount cut by the House that year, but it was clear that subsidies would continue to be cut annually.[1] The CAB recommended to the three carriers that they curtail some services to operate within the reduced subsidy ceiling. CHA discontinued its mail service and LAA and NYA curtailed proposed route expansion.[2]

The same situation developed in 1962 and 1963. The House would drastically cut the subsidy and the Senate would restore a portion of the cut, but a little less each time.[3]

In 1964 the battle over subsidies between the Congress and the CAB prompted talk of holding public hearings in the Senate on the subject. After the Senate compromised with the House on a $3.5 million subsidy ceiling for Fiscal Year 1965--down from the $4.3 million that the CAB felt was the absolute minimum[4]--efforts were begun to hold hearings in the current fiscal year (1965) with the intent of ". . . establishing a firm national policy on subsidized helicopter operations, with clear-cut guidelines indicating how many such operators are needed and what the anticipated subsidy cost may be over a span of years."[5]

The CAB had long been criticized by the House members who were looking for an economy issue because of its firm support of the helicopter

---

[1]"Helicopter Lines Claim Subsidy Cut Would Bar VTOL Breakthroughs," Aviation Week, July 3, 1961, p. 36.

[2]Glenn Garrison, "NY Airways 107 Fleet Keyed to Subsidy," Aviation Week, October 30, 1961, p. 36.

[3]"Senate Backs Helicopter Subsidies," Aviation Week, November 4, 1963, p. 43.

[4]James R. Ashlock, "Expansion Seen Saving Helicopter Service," Aviation Week, August 24, 1964, pp. 34-35.

[5]"Senate Probe of Helicopter Subsidy Due," Aviation Week, July 13, 1964, p. 34.

airlines. It was argued that these three certified airlines should be receiving subsidies from the localities they served and not the federal government. Because their operations were essentially intrastate (except for NYA service to Newark) or, more accurately, intracity; foes in Congress felt they should be no more federally subsidized than taxicabs and city bus lines.[1] Yet, in the past, the CAB could not expand the helicopter service to other metropolitan areas to gain the support of House members because the subsidy need would have been prohibitive. There were an estimated eighty applications to provide helicopter service at one time, but pressure to limit and reduce subsidy payments, both from the CAB's staff level and the Congress, prevented any action on them. A factor that made the CAB all the more uncomfortable in front of Congress was the initial success of the non-subsidized SFO Airline.[2]

Despite the House warning in the Fiscal 1965 appropriation that the House did not want to see a Fisoal 1966 budget request for a helicopter subsidy, Chairman Boyd insisted on submitting a Fiscal Year 1966 budget request, incurring the wrath of some in Congress who did not support the helicopter airlines. His basis for prosecuting the case was Section 406 which required him to support the helicopter airlines as he did the local airlines. This was in direct conflict with the uncertain intent of Congress who must appropriate subsidy funds to the CAB to carry out its responsibilities under Section 406. If under the Civil Aeronautics Act of 1938 the CAB was required to set a compensation rate for mail carriage on the one hand, and the Congress

---

[1]Ashlock, "Expansion Seen Saving Helicopter," p. 34.

[2]"Senate Probe Due," p. 34.

did not appropriate funds to cover that rate on the other, the CAB felt that the federal government would be open to prosecution by the helicopter airlines for failure to honor their legal claims.[1]

In November, 1964, the CAB began a two-phase campaign to sell the Budget Bureau, then the Congress, on a $13.5 million, five-year plan under which subsidy to the three helicopter airlines would be decreased from $4.2 million in Fiscal 1966 to $1.1 million in Fiscal 1970, and ending subsidies after that year.[2]

Public hearings began on March 8, 1965, and continued through the 11th. Interested and affected organizations were given the opportunity to voice their opinions on the subject before Senate Aviation Subcommittee of the Committee on Commerce chaired by Senator A. S. Mike Monroney (D-Okla.), a sympathetic supporter of the helicopter industry. Federal Aviation Agency Administrator N. E. Halaby represented President Lyndon Johnson's view that the subsidy should end because it benefited only a few people. Senator William Proxmire (D-Wis.) called the helicopter subsidy an "example of a thrill we have in all our federal programs."[3]

Senator Robert Kennedy (D-N.Y.) pressed for the subsidy, as did all four presidents of the helicopter airlines, the affected communities served by the airlines, and the various congressmen representing the affected districts.[4]

---

[1] Ibid.

[2] "CAB Helicopter Subsidy Campaign," Aviation Week, November 30, 1964, p. 29.

[3] "Trunklines May Discuss Methods to Ease Helicopter Lines' Plight," Aviation Week, March 22, 1965, p. 29.

[4] Ibid.

Testimony of the hearings was recorded, as usual, and is available from the Commerce Committee or the CAB library. Entitled the Helicopter Air Service Program, this reference was utilized extensively in Chapter II. Because of the length and detail, a full discussion of the pros and cons of the subsidy continuance would not be appropriate here.

The hearings served only to publicize the views of the various opponents and proponents of the subsidy question. No legislation resulted from them, and the question of who has the power to grant subsidy funds, the Congress or the CAB, remained unresolved. Eventual airline support of the helicopter airlines sidestepped that question, allowing the CAB to eliminate the subsidy.[1]

Two events took place in 1965 that drew the curtain on further helicopter subsidies. By April 12, 1965, the CAB's funds that were designated for the helicopter operators in the Fiscal 1965 appropriation were exhausted. Because the CAB was not authorized to transfer funds for helicopter subsidy from any other source, a request for a supplemental appropriation of $942,000 to cover the months of April, May, and June, 1965, was made.[2]

This deficiency was caused by the Congress in 1964 when it cut nearly $1 million from the CAB's $4.3 million helicopter subsidy request, even though the CAB had issued a rate order obligating itself for the larger amount. Throughout Fiscal 1965, payments to the carriers were

---

[1]Harold D. Watkins, "Airlines to Meet Again on Helicopter Aid," Aviation Week, May 10, 1965, p. 43.

[2]Richard G. O'Lone, "Helicopter Carriers Facing Early Crisis," Aviation Week, April 12, 1965, p. 47.

made based on this rate order and this led to the exhausted funds.[1]

The House refused to accept the $942,000 additional supplemental appropriation which was added to a House-passed supplemental appropriations bill by the Senate. Following this House vote, the Senate with only a handful of members present then agreed to leave the subsidy out of the final bill.[2] As envisioned by Chairman Boyd, the three helicopter carriers brought suit in the United States Court of Claims and recovered from the government the $942,000 due them.[3]

Despite the efforts of the House Appropriations Committee, following the recommendations of Rep. Albert Thomas' Independent Offices Subcommittee to cut the $2.1 million requested in the Fiscal 1966 budget for helicopter subsidies,[4] the Congress provided a limited appropriation for the helicopter operators with a cut-off date of December 31, 1965.[5] The subsidization of the helicopter carriers by the federal government had come to an end.

Summary

Originally economic regulation of the air transportation industry began with the Post Office Department. Irregularities in the awarding of air mail contracts in those years prompted the enactment of the Air Mail Act of 1934 which made the Interstate Commerce Commission, the Bureau of Air Commerce, and the Post Office Department responsible

---

[1] Ibid.

[2] Watkins, "Airlines to Meet Again," p. 42.

[3] CAB, "Major Board Actions," Handbook, p. 469.

[4] Watkins, "Airlines to Meet Again," p. 42.

[5] CAB, "Major Board Actions," Handbook, p. 469.

for the control of civil aviation. The Post Office Department still retained control over entry into the air industry through its awarding of air mail contracts.

However, it was soon apparent that three agencies could not effectively manage the industry. At the recommendation of a policy committee, responsibility for civil aviation was assigned to one federal body. The Civil Aeronautics Act of 1934 established the Civil Aeronautics Authority to control civil aviation. In 1940 President Roosevelt, by executive order, divided the Civil Aeronautics Authority into the Civil Aeronautics Administration, which was responsible for safety and administrative procedures in civil aviation; and the Civil Aeronautics Board, which was responsible for the economic regulation of civil aviation much like the Post Office Department had been in earlier years.

In 1958 the Federal Aviation Act was passed. It created the Federal Aviation Agency which replaced the Civil Aviation Administration and its functions. At the same time, it reconfirmed the Civil Aeronautics Board's role as an independent, economic regulator of civil aviation.

The CAB, under the mandate handed down by the Congress in the form of a Declaration of Policy and under the power granted by Titles IV and X of the Civil Aeronautics Act of 1934, was quick to promote helicopter service following World War II. Section 406(a) allowed the CAB to fix mail rates; Section 406(c) stated that the Post Office Department should pay the helicopter carriers for the delivery of mail; and Section 406(b) stipulated that the remainder of the total mail compensation (the subsidy portion) would be paid by the CAB out of appropriations from Congress in order to promote air transportation.

With this authority the CAB continued to provide subsidies to the three certified helicopter carriers from 1947 until 1965 in an effort to maintain helicopter service until that industry could become self sufficient. However, the increasing deficits in the national budget prompted the Congress in 1960 to begin a program of gradual elimination of aviation subsidies. By 1965 when subsidies were dropped, the CAB had provided approximately fifty million dollars to the helicopter carriers which represented 57.6 percent of the total overall revenues acquired by the carriers since 1954.

Pressure for the subsidy cutoff originated in the House Appropriations Committee's Independent Offices Subcommittee in June 1961. It received support from the House body, but the Senate Commerce Committee's Aviation Subcommittee successfully fought drastic reductions in subsidies until 1965. At that time pressure from the Senate, the President of the United States, and federal aviation officials (except Chairman Boyd of the CAB) succeeded in vetoing further subsidies. An influential factor in the defeat of further annual subsidies until 1970 was essentially the relatively small areas which the helicopter carriers serviced. Lacking the broad support that the regional air carriers experienced, it became difficult to justify public funds for services that benefited only three metropolitan areas in the country.

CHAPTER V

THE COMMERCIAL AIRLINES' ROLE

Introduction

A discussion of helicopter service in the United States would not be complete without citing the important role of the large commercial airlines in its development. Perhaps the word "development" is not appropriate, because the airlines did not begin to take a truly active role in helicopter service until the mid-1960's. Nevertheless, the airlines' participation spelled the difference between a helicopter airline's continued operation and closure.

Because of the late active appearance of the large airlines, relative to the helicopter airlines' passenger-carrying history, it would be best to divide our study into two periods. In this way the degree of support given the helicopter airlines by the trunklines will be readily seen. The first period will be labeled pre-1965, and the second period will be labeled post-1965.

Pre-1965

The first twelve years of commercial helicopter passenger service found the large commercial airlines treating the helicopter airlines as equals in the transportation field. Their attitude was not one of benevolent paternalism, but one of "strictly business" without special favors. The helicopter community was expected to survive on

its own merits, and what assistance the fixed-wing airlines provided was of mutual benefit to both.

The trunkline's role in support of helicopter service was that of providing passengers to the helicopter airlines while, at the same time, the latter was providing passengers to the trunks. This was accomplished in three ways: promotion of helicopter service through local, long-haul fixed-wing airlines and travel agent advertising;[1] helicopter airline use of trunkline facilities such as NYA's use of American Airlines' gate and other operational facilities without charge[2] or LAA's use of United Airlines' baggage transfer mechanism and other facilities at favorable rental rates;[3] and joint fare agreements. The joint fare agreement was the most substantial contribution by the trunklines in this period, and it therefore deserves considerably more attention.

The joint fare agreement was one of many such agreements that all airlines participated in. These airline-wide agreements, known as "interline" services, made it possible for a helicopter airline passenger to be ticketed jointly on a helicopter airline and any of the world's scheduled airlines, and to have his baggage checked through to his destination on a single interline baggage check.[4] This eliminated the inconvenience of having to purchase two tickets--one for the helicopter flight, and the other for the fixed-wing flight--and having to carry his

---

[1]Gregory, "Los Angeles Airways Expands," p. 45.

[2]New York Airways, 1964 Annual Report.

[3]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 172.

[4]Ibid., p. 285.

baggage from one aircraft to another himself.

NYA instituted the first of the helicopter fixed-wing joint fares in 1955 with Northwest Airlines.[1] Under a joint fare, a passenger receives helicopter transportation as part of a fixed-wing journey for less (or for free) than the sum of the fixed-wing and helicopter fares if these were purchased separately.[2] That is, if a passenger traveling from Newark Airport to the Los Angeles Airport via the John F. Kennedy International Airport purchased, first, a ticket for the helicopter flight from Newark to John F. Kennedy, and then a separate ticket from John F. Kennedy to Los Angeles, he would be paying more than the joint fare price which allows a reduction to the passenger. This reduction is absorbed by both the fixed-wing carrier and the helicopter airline at some specified rate established by a voluntary bilateral arrangement between the two carriers. Because of this situation, each joint fare agreement must be a good business proposition.[3]

There are three primary reasons for entering into a joint fare agreement. All are designed to attract more passengers, thus increasing operating revenues for both carriers. The first reason is due to competition. A fixed-wing airline is willing to establish a reduced rate to the customer in the form of a joint fare in order to provide better service and, at the same time, increase their business. Competition also prompts a carrier to establish a joint fare if a competing airline has done so. A second reason might be because of a lack of operating

---

[1]"Eight Airlines Sign Pact with NYA," Aviation Week, October 31, 1955, p. 86.

[2]Hearings before the Senate Aviation Subcommittee, Helicopter Program, p. 193.

[3]Ibid., pp. 224-25.

space at one airport, and joint fares with a helicopter operator enables the fixed-wing airline to offer service to the public through both airports while only serving one. An example would be the NYA-Northwest agreement in 1955. Northwest was serving John F. Kennedy, but not Newark Airport. Because they wanted to serve people flying into Newark, they entered into a joint fare agreement with NYA to provide free transportation from Newark to John F. Kennedy for its customers. The third reason is similar to the second, but it differs in that a trunk airline decides to stay out of an airport rather than the lack of space preventing him from moving in.[1]

The absorption rate of the reduced amount of fare is usually dependent on the fixed-wing carrier's fare which is based on the distance of its flight. Table 18 provides a typical example of how joint fares are absorbed. SFO's joint fare arrangement is similar to CHA's the latter of which is displayed in the table. Only the lowest and highest category of the trunkline fare range is given to provide an understanding of the mechanics of joint fares.

Post-1965

The March, 1965, hearings before Senate's Aviation Subcommittee was the turning point in the fixed-wing carriers' attitude of mutual benefit arrangements with the helicopter airlines. Under the four-year long pressure being applied by the House Appropriations Committee to cease providing funds to subsidize the helicopter carriers, the Senate began a movement to convince the trunk airlines that they should assume a major share of the cost required to keep three subsidized helicopter

[1] Ibid., p. 225.

TABLE 18

TRUNKLINE-HELICOPTER JOINT FARES SHOWING SAMPLE DISTRIBUTION OF CHA'S REGULAR FARE
(1965 Fares)

Between O'Hare and	Regular CHA Fare	When trunk fare is $1 to $25:			When trunk fare is over $100:		
		Passenger Pays	Trunk Pays	CHA Absorbs	Passenger Pays	Trunk Pays	CHA Absorbs
Downtown	$6.00	$5.00	$0.50	$0.50	$3.00	$2.50	$0.50
Gary	9.00	8.00	.50	.50	6.00	2.50	.50
Midway	6.00	5.00	.50	.50	3.00	2.50	.50

Source: Hearings before the Senate Aviation Subcommittee, *Helicopter Program*, p. 273.

airlines in business.[1]

Stuart G. Tipton, the president of the Air Transport Association, disagreed with Senator A. S. Mike Monroney, chairman of the Subcommittee, on the grounds that the airlines were already ". . . giving the helicopters about $1 million a year in interline business . . . which was as far as the airlines should go or be expected to go."[2] On this first day of the hearings, he stressed that:

> The Congress has set out to develop a regularly scheduled helicopter service as a common carrier tool available to the general public, not just to airline passengers. Expecting the airlines to pick up the remaining subsidy would in my opinion destroy the value of the experiment. Inevitably helicopter service would then be developed solely as an adjunct to airline schedules . . .[3]

Sensing that he had hit a sensitive area by his interpretation of interline agreements as trunkline support of the helicopter lines and by his adamant stand on further airline support, Stuart Tipton reversed himself on March 11, 1965, the fourth and final day of the hearings, by emphasizing the airlines' willingness to cooperate with the federal government in keeping helicopter service alive.[4]

In response to this appeal for helicopter assistance in light of the House's avowed promise to end subsidies in 1965, the trunk airlines agreed to launch an industry-wide promotional campaign to stimulate patronage on the four certificated helicopter carriers. Point-of-sale

---

[1]"Trunks Balk at Aiding Helicopter Carriers," <u>Aviation Week</u>, March 15, 1965, p. 291.

[2]<u>Ibid</u>.

[3]Hearings before the Senate Aviation Subcommittee, <u>Helicopter Program</u>, pp. 98-99.

[4]<u>Ibid</u>., pp. 360-64.

displays, brochures, and helicopter schedules in each trunkline carrier's schedule leaflet were some of the promotional techniques exercised by the individual airlines in addition to the industry-wide campaign.[1]

Delta Airlines arranged a more liberal joint fare agreement with three helicopter operators. It called for a Delta passenger to pay one-half of the regular fare for helicopter tickets, with Delta making up all of the difference. In earlier joint fare arrangements, the helicopter operator had to absorb some of the reduction.[2]

From May, 1965, on, Trans-World Airlines (TWA) and Pan American World Airways (PAA) began a series of operating and financial support agreements with NYA and SFO. Initially designed as interim agreements until the subsidy question was resolved in 1965, they eventually replaced the federal subsidies long granted to the helicopter carriers.

On May 24, 1965, SFO asked the CAB to approve an agreement with TWA in which the latter airline would guarantee the breakeven expense of round trip service between TWA's ramp area at San Francisco International Airport and the Santa Clara County points of Sunnyvale and Palo Alto.[3]

The first large direct financial support offered on June 7, 1965, by the large fixed-wing carriers was PAA's and TWA's planned loan to NYA of $995,000 and a plan to underwrite virtually all of the helicopter carrier's flight hours for a certain unspecified length of time.

---

[1]Harold D. Watkins, "Congressional Debate Endangers Subsidized Helicopter Operations," Aviation Week, May 3, 1965, p. 29.

[2]Ibid.

[3]"Scheduled Helicopters Continuing Operations," Aviation Week, May 31, 1965, p. 26; and CAB, Docket 16180.

In addition, PAA offered to purchase a third Boeing V-107 ordered by NYA earlier and to return NYA's down payment on the aircraft to reduce that airline's bank loan. This helicopter, plus two other V-107's ordered by PAA itself, would be leased to NYA by PAA.[1]

The agreement was so drawn that neither TWA or PAA would be able to dominate the affairs of NYA. Recovery of the two airlines' full investment was not explicitly promised. The payments covered the difference between revenues and expenses, plus an eight percent return to NYA, on the particular routes each airline supported. In general, TWA supported flight operations between the Wall Street Heliport, Manhattan, and Newark, LaGuardia and Kennedy airports. PAA's route was between the Pan Am rooftop heliport and the John F. Kennedy Airport.[2]

The CAB tentatively approved the PAA-TWA plan until a formal study could be made. The regulating agency was faced with a situation that clearly violated Sections 408 and 409 of the Civil Aeronautics Act relating to interlocking relationships and air carrier agreements, respectively. But with the Congressional withdrawal of federal subsidies, there appeared to be little choice but to circumvent the law. Either some measure of relief had to be provided or NYA would close down. They were reluctant, but the urgency of the situation required immediate aid.[3] The final decision on the PAA-TWA plan for NYA was approved in part on May 20, 1966.[4]

---

[1]"Pan American, TWA Agree to Aid NY Airways in Survival Effort," Aviation Week, June 21, 1965, p. 34.

[2]"CAB Cool to Airline Aid for NY Airways," Aviation Week, July 5, 1965, p. 28.

[3]Ibid.

[4]CAB, Docket 16216, Order No. E-23704.

In December, 1965, the CAB established conditions which should apply when helicopter airlines received financial assistance from fixed-wing carriers. These conditions applied to LAA, SFO, and CHA, as well as other trunklines where applicable, even though NYA, PAA, and TWA were mentioned specifically. The conditions were:

1) NYA scheduling practices must not be influenced in any manner by either PAA or TWA;

2) There must be no restrictions on the use of any aircraft purchased;

3) All operations must be conducted for the general benefit of the traveling public with no preferential treatment extended to any particular segment;

4) The display by NYA of any markings other than its own must be prohibited;

5) There should be no restrictive conditions which would prevent NYA from negotiating similar arrangements with any other carrier; and

6) There must be no restrictions or impediments on NYA operations from the Pan Am building heliport.[1]

Another example of the type of support the trunklines began to give the helicopter airlines took place in June, 1966. American Airlines (AA) and Trans-World Airlines (TWA) agreed to underwrite costs on all seventy-four daily flights of SFO up to its previously highest cost per month and guarantee an additional $9,000 per month. Under a two-year agreement, TWA underwrote costs on forty-nine flights a day to San Francisco Bay area airports up to an average cost of $535,000 per month in a given year. AA underwrote costs on twenty-five flights per day up to an average cost of $275,000 a month. AA would pay the additional

---

[1]"Helicopter Aid Conditions Detailed," Aviation Week, December 6, 1965, p. 40.

$9,000 per month.[1]

Additional support was provided by both trunklines when TWA and AA guaranteed $1 million and $500,000, respectively, borrowed by SFO from the Bank of America. In return for the guarantees, AA and TWA were given stock warrants for 37,500 and 75,000 common shares, respectively.[2]

One more example of financial assistance was a joint loan agreement by AA and United Airlines for $3.2 million approved by the CAB on February 17, 1966. Payment of interest on the five percent subordinated convertible income notes was contingent on earnings subsequent to December 31, 1965.[3]

Of all the helicopter airlines, NYA had the most extensive operating and support agreements. A final example of each is provided to show the amount of support they received from the large fixed-wing airlines.

On August 27, 1969, NYA entered into an Operating Agreement with PAA, effective upon recommencement of proposed service from the Pan Am building heliport.[4] Under the terms of that agreement, PAA would share the company's costs and revenues from annual support payments to NYA of up to $260,000, should the service operate at a specified deficit, to payments from NYA not to exceed $481,000 a year

---

[1]CAB, Docket 18011, Order No. E-24800.

[2]Frank J. St. Clair, ed., Moody's Transportation Manual 1966 (New York: Robert H. Messner, Publisher, 1966), p. 1043.

[3]Frank J. St. Clair, ed., Moody's Transportation Manual 1968 (New York: Robert H. Messner, Publisher, 1968), p. 1385.

[4]A disagreement between PAA and NYA over financial support of NYA closed the heliport on February 15, 1968. "Wall Street Helicopter Service is Assured," Aviation Week, March 11, 1968, p. 33.

in the event revenues exceed related expenses.[1]

In a Financing Agreement with PAA, on August 27, 1969, NYA sold 284,991 shares of capital stock at $3.50 per share to PAA in 1969. In addition, NYA granted options to PAA to purchase 245,160 more shares at the same price. In the event that PAA exercised this option and it resulted in PAA's holdings in NYA exceeding forty-five percent of the total voting capital shares issued and outstanding, the excess stock would be exercisable in Class B, non-voting, capital stock.[2] This was in keeping with the CAB's conditions of air carrrier agreements laid down in 1965.

An equipment agreement on January 23, 1970, subleased four Sikorsky S-61L helicopters to NYA by PAA. The agreement included spare engines and parts, along with the responsibility for maintenance being shouldered by NYA.[3]

A Support Agreement on February 6, 1969, provided for intensified traffic support and promotional efforts by American Airlines (AA) for NYA services to and from the Lower Manhattan heliport and the three area airports. Among other things, this agreement provides that AA will make available to NYA ramp space and gate facilities at Newark, LaGuardia, and John F. Kennedy airports without cost. Also, AA will furnish a complete passenger reservation service in NYA's name. AA will absorb forty percent or more of NYA's one-way fares for passengers using those American flights originating or terminating in long distance flights.

---

[1]George H. Parsons, ed., Moody's Transportation Manual 1970 (New York: Robert H. Messner, Publisher, 1970), p. 1398.

[2]Ibid.

[3]Ibid.

The AA agreement is a ten-year agreement and it does not prevent NYA from operating flights from terminal areas of other airlines.[1]

With these sample agreements, it is readily apparent that the degree of fixed-wing airline interest in helicopter carriers increased tremendously from the pre-1965 period. And there can be no doubt that the federal government applied generous amounts of pressure on the airline industry to fill the subsidy void with their own revenues.

Summary

The trunk airlines' role in supporting scheduled helicopter operations can be divided into two periods: "pre-1965" and "post-1965."

In the early period trunk lines treated the helicopter carriers as equals in the aviation transportation industry. Favorable terms were granted only if the result would provide more revenue passengers to the trunk lines. In this period, trunkline support manifested itself in promotion of helicopter service by the local, long-haul, fixed-wing airlines; helicopter carrier use of trunkline facilities; and the use of joint fare agreements.

The joint fare agreement was by far the most prominent support given by the trunklines in this early stage. Under the joint fare, a passenger received helicopter transportation as part of a fixed-wing journey for less (or for free) than the sum of the fixed wing and helicopter fares if these were purchased separately.

The post-1965 period marks the end of subsidy payments to the helicopter carriers and the beginning of a more benevolent attitude on the part of the trunklines toward commercial helicopter service. This

---

[1] Ibid.

action was prompted by the Congress who applied pressure to the airline industry to provide more direct support to the helicopter carriers since they would directly benefit from such support. The airline industry somewhat reluctantly agreed to replace the government's subsidy role. This took the form of helicopter promotion, more liberal joint fare agreements, the guaranteeing of breakeven expense on selected route segments of the helicopter carriers, financial support in the form of loans and the underwriting of a carrier's flight hours for a certain length of time, the guaranteeing of bank loans, equipment agreements which provided for the subleasing of helicopters and parts, and support agreements which provided more facilities for helicopter operations.

Clearly, Sections 408 and 409 of the Civil Aeronautics Act of 1938 which prohibited interlocking relationships and air carrier agreements were being violated with this trunkline support. But with federal subsidies cut off, the urgency of the situation required that some relief be provided. Certain conditions were imposed by the CAB on the trunklines to prevent the trunklines from controlling the helicopter carriers.

CHAPTER VI

CONCLUSION

The commercial helicopter passenger transportation industry as represented by the four certificated helicopter carriers--Los Angeles Airways, Chicago Helicopter Airways, New York Airways, and San Francisco-Oakland Airlines--has not performed well economically but has provided a valuable service to those passengers willing to pay for its expensive service.

In providing a valuable service, we have only to look at the crowded highways and streets in the metropolitan areas served by the four carriers. In the New York and San Francisco areas, this problem is compounded by the natural water barriers. The helicopter carriers played an important role in overcoming those man-made and natural barriers by providing a time saving service to those people who considered time valuable, whether it was for business or pleasure. This service of convenience and necessity, so aptly put by the CAB on its certification titles, was particularly apparent where passengers arriving at one airport had to connect with a scheduled flight at another airport. A passenger in such a situation had one of three alternatives to choose from: 1) a long layover that would allow a low cost, leisurely bus trip to the other airport; 2) attempt to make the connection as fast as possible by cab, but enduring the traffic and paying a higher fare; or 3) pay a still higher fare but avoid the traffic and the worry of a

missed connection by utilizing the helicopter service. An increasing number annually chose the helicopter service up until 1967. It was no coincidence that SFO's, NYA's, and CHA's most heavily traveled routes were between airports.

But in light of this apparent valuable service offered by the helicopter, a very important question should be asked: do the benefits justify the cost? The facts say no, for a number of reasons.

The highest number of annual passenger originations for the helicopter carriers occurred in 1966, 1967, and 1968. In 1968, that number was 1,041,000 scheduled passenger originations. In that same year, the total number of originating and terminating passengers utilizing scheduled domestic airline service in New York, San Francisco, Chicago, and Los Angeles totaled 55,332,000 passengers.[1] That means that only approximately 1.9 percent of those 55,332,000 utilized helicopter service in those cities.

In 1968 total operating costs of the four carriers totaled approximately $16,177,000 which exceeded transportation revenue by approximately $5,609,000. Should a service be continually provided that loses that much money to carry only 1.9 percent of the total potential passengers it could carry?

This situation has been repeated annually by the carriers since the commencement of their service. There was not one year in the helicopter passenger transportation industry history that they did not lose less than approximately $4,091,000. The most profitable helicopter airline in the industry in terms of transportation revenue versus total

---

[1]CAB, Handbook of Airline Statistics 1968, p. 387.

operating costs was SFO Airlines. Its most "profitable" year was 1964 when it lost approximately $157,000!

The primary reason for these tremendous annual losses is the high cost of operating a helicopter. A measure of this cost in relation to revenues can be seen when it is based on a per passenger mile standard. The annual average revenue yield per passenger mile in the period from 1957 to 1968 was thirty-five cents but the operating cost was eighty-seven cents per passenger mile. Another measure of operating costs is based on a per available ton-mile measured in dollars. This has gradually declined from $6.75 in 1953 to $2.64 in 1968. But when the last figure is compared to fixed-wing aircraft operation, there is a startling contrast. In 1963, 1965, and 1967, local service carrier costs per available ton-mile were .475, .460, and .398 cents, respectively.

There are two ways to overcome this high cost of operation. A more economical helicopter could be produced, and/or the revenue passenger load factor could be increased. The former is not likely in the very near future because of the declining business in the helicopter manufacturing industry creating a lack of money for research and development; and because the market for commercial passenger helicopters is too small to justify the expense. Consequently, the latter method of improved revenue yields per passenger mile must be approached. But this means that load factors must be increased from an average of 41.7 percent from 1953 to 1970. This average has been decreasing since 1966, along with the number of available seat-miles, indicating a declining demand for helicopter service.

Having established the costs of operation, one must ask why the CAB continued to subsidize the commercial helicopter passenger transportation industry from 1947 to 1965 until prodded by the Congress to end the subsidies? In the early years, there can be no doubt that the CAB was justified in supporting the commercial helicopter industry because of its newness in aviation and the lack of operational data to evaluate its potential. But one wonders why that organization continued to subsidize the carriers on the basis of the antiquated mail statutes in the Civil Aeronautics Act when passenger service constituted the bulk of the carriers' revenues and the emphasis was on passenger service. This state of affairs cost the government approximately $49,867,000 in subsidies (not including the mail pay to pay for what little mail was carried) from 1954 to 1965. This amounted to 57.6 percent of the industries' total overall revenues.

It was no wonder that the Congress had its way in reducing the subsidies. For all the federal funds provided to make the helicopter industry self-sufficient, the industry still continued to lose money annually at a fairly consistent rate.

By 1965 the Congress--a <u>national</u> body--could not justify supporting the helicopter carriers--a <u>locally-oriented</u> organization--any longer. There was no longer any justification for supporting the carriers on the grounds of ". . . present and future needs of the foreign and domestic commerce of the United States, of the Postal Service, and of the national defense" as stated in the CAB's Declaration of Policy. Domestic and foreign needs were being met by less expensive transportation systems. The postal service was no longer a big user of the helicopter. And the military had established a substantial

helicopter inventory and developed sufficient cost data and expertise that reliance on commercial operators for such information was reduced if not eliminated. The Congress was justified in cutting off the subsidies on this basis.

The trunk airline industry's replacement of the federal government in the role of grand subsidizer was a temporary relief to the helicopter industry. It was temporary in that eventual shutdown for some was only postponed a while longer. All the joint fares, promotional schemes, loans, stock purchases, and underwritings seem to ignore the fact that a more economical helicopter was needed to perform the intra-city and inter-airport transportation service. This is apparent when you compare the transportation revenue and operating cost figures. From 1966 through 1968, except for NYA, the losses increased each year.

The primary recommendation is very obvious at this point. Some way must be found to manufacture a helicopter whose costs of operation are comparable to competing types of aircraft and conducive to making a profit. The costs per available seat-mile are still too high.

Until costs of operation are brought down, ways of increasing the overall load factor must be uncovered. A step in the right direction would be a concerted effort on the part of aviation promoters and influential citizens to locate downtown heliports in places convenient to the users of helicopter services. In all cases, except the Pan Am building in New York, presently established downtown heliports were located at remote sites in the interests of safety rather than convenience for potential customers. Safety should not be compromised, but neither should convenience when the safety of helicopter operations has long been established.

Finally, larger capacity helicopters are not the answer to reducing costs in the intra-city and inter-airport market. Load factors are low with the present capacity. To increase the load factor, expanded operations should be undertaken to attract more revenue passengers.

APPENDIX

Sikorsky S-51

Type: 4-seat general utility helicopter.

Rotors: 3-blade main rotor and tail rotor.

Power plant: One 450 hp Pratt and Whitney R-985 Wasp, Jr. nine-cylinder radial, fan-cooled engine.

Fuel capacity: One tank forward of engine with a capacity of 100 gallons and one aft of engine with a capacity of eight gallons.

Accommodation: Enclosed cabin seating four (pilot centrally in front and three passengers on a cross bench aft).

Dimensions:	Main rotor diameter	48 ft.
	Tail rotor diameter	8 ft. 5 in.
	Length overall	57 ft. ½ in.
Weights:	Weight empty	3650 lbs.
	Disposable load	1250 lbs.
	Weight loaded	4900 lbs.
Performance:	Maximum speed at sea level	130 mph
	Maximum economical cruising speed	85 mph
	Maximum rate of climb at sea level	1200 ft. per min.
	Range	260 miles

Source: Leonard Bridgman, ed., Jane's All the World's Aircraft 1949-1950 (New York: The McGraw-Hill Book Company, Inc., 1949), p. 277C.

Sikorsky S-55A

Type: 12-seat general utility helicopter.

Rotors: 3-blade main rotor and 2-blade tail rotor.

Power plant: One R-1300-3 Wright radial air cooled engine rated at 700 hp.

Fuel capacity: One 185-gallon tank.

Accommodation: Pilot's compartment contains pilot and co-pilot sitting side by side with flight controls for each. Cabin is located aft and below the pilot's compartment and it has a capacity of seven passengers.

Dimensions:	Main rotor diameter	53 ft.
	Tail rotor diameter	8 ft. 9 in.
	Length overall	42 ft. 2 in.
Weights:	Weight empty	5250 lbs.
	Disposable load	2250 lbs.
	Weight loaded	7500 lbs.
Performance:		
	Maximum speed at sea level	112 mph
	Cruising speed	91 mph
	Maximum rate of climb at sea level	1020 ft. per min.
	Range (with reserve)	360 miles

Source: Leonard Bridgman, ed., Jane's All the World's Aircraft 1959-1960 (New York: The McGraw-Hill Book Company, Inc., 1959), pp. 386-88.

Sikorsky S-58C

Type: 12-18 seat commercial passenger helicopter.

Rotors: 4-blade main rotor and tail rotor.

Power plant: One Wright R-1820-84 radial air-cooled engine rated at 1525 hp.

Fuel capacity: One tank with a fuel capacity range from 198 to 307 gallons depending on the model.

Accommodation: Flight and cabin compartments similar to S-55. Cabin has a capacity of 12 to 18 passengers depending on model.

Dimensions:	Main rotor diameter	56 ft.
	Tail rotor diameter	8 ft. 9 in.
	Fuselage length	46 ft. 9 in.
Weights:	Weight empty	7675 lbs.
	Disposable load	5325 lbs.
	Weight loaded	13000 lbs.
Performance:		
	Cruising speed at sea level	101 mph
	Maximum rate of climb at sea level	1000 ft. per min.
	Range (with reserve)	190 miles

Source: Ibid., p. 384.

Vertol-Boeing V44B

Type: 15-seat commercial passenger transport.

Rotors: Two 3-blade main rotors located forward and aft in a tandem configuration.

Power plant: One Wright Cyclone 977C9 HD1 nine-cylinder radial air-cooled engine rated at 1425 hp.

Accommodation: Crew of two sitting side by side with dual controls in forward compartment. Cabin has capacity for fifteen passengers.

Dimensions:	Rotor diameter	44 ft.
	Length overall	86 ft. 4 in.
Weights:	Weight empty	8990 lbs.
	Disposable load	5360 lbs.
	Weight loaded	14350 lbs.
Performance:		
	Maximum speed at sea level	127 mph
	Cruising speed	101 mph
	Maximum rate ofclimb at sea level	1050 ft. per min.
	Range (with reserve)	280 miles

Source: Ibid., pp. 398-99.

Sikorsky S-62

Type: 8 to 11-seat utility helicopter

Rotor: 3-blade main rotor and 2-blade tail rotor

Power plant: 1050 shaft horsepower (shp) General Electric T-58-6 shaft turbine.

Fuel capacity: 182 gallons

Accommodation: Pilot's compartment like S-55 and S-58. Cabin capacity is eight to eleven passengers.

Dimensions:	Main rotor diameter	53 feet
	Tail rotor diameter	8 ft. 9 in.
	Fuselage length	44 ft. 7 in.
Weights:	Weight empty	4614 lbs.
	Disposable load	1884 lbs.
	Weight loaded	7500 lbs.
Performance:		
	Maximum speed at sea level	124 mph
	Cruising speed	115 mph
	Maximum rate of climb at sea level	1380 ft. per min.

Notes: 1) The S-62 used some S-55 components such as the main and tail rotor blades and heads, main and intermediate gearboxes, shafting, tail rotor pylon, and portions of the flight controls and hydraulic systems.

2) The S-62 was designed from the start for amphibious operations. The bottom of the fuselage was watertight and strengthened to permit landings on either water or snow. Two outrigger floats containing partially retractable gear were designed to resist rolling during

touchdown or while on water.

3) The S-62 could carry 630 lbs. more than the S-55, but weighed 350 lbs. less because of the lighter weight of the turbine engine.

Source: Ibid., p. 390.

Sikorsky S-61

Type: Twin-turbine all-weather helicopter airliner.

Rotor: 5-blade main and tail rotor.

Power plant: Two 1250 shp General Electric CT-58-110-1 shaft turbine engines.

Fuel capacity: Forward tank contains 210 gallons and aft tank contains 200 gallons.

Accommodations: Flight compartment like the S-55. Cabin in S-61L contained twenty-eight passengers and S-61N contained twenty-six.

Dimensions:	Main rotor diameter		62 ft.
	Tail rotor diameter		10 ft. 4 in.
	Fuselage length:	L	72 ft. 7 in.
		N	72 ft. 10 in.
Weights:	Weight empty	L	11333 lbs.
		N	12000 lbs.
	Disposable weight	L	7667 lbs.
		N	7000 lbs.
	Weight loaded	L	19000 lbs.
		N	19000 lbs.
Performance:	Maximum speed at sea level		150 mph
	Average cruising speed		140 mph
	Maximum rate of climb at sea level		1300 ft. per min.
	Range (with 30 min. reserve)		275 miles

Note: The S-61L model was a non-amphibious version while the S-61N was amphibious with a sealed hull and stabilizing floats, like the S-62.

Source: John W. R. Taylor, ed., Jane's All the World's Aircraft 1964-65 (New York: McGraw-Hill Book Company, Inc., 1965), pp. 294-95.

Boeing-Vertol V-107 II

Type: Twin-engine, tandem commercial transport helicopter.

Rotor: Two 3-blade main rotors in tandem.

Power plant: Two 1250 shp General Electric CT-58-110-1 shaft turbine engines mounted side by side at the base of the aft rotor pylon.

Fuel capacity: Two fuel tanks, one located in each sponsoon. Capacity is 350 gallons.

Accommodation: Flight compartment like the V44. Cabin contained twenty-five passengers.

Dimensions;	Main rotor diameters	50 ft.
	Fuselage length	44 ft. 7 in.
Weights:	Weight empty	10732 lbs.
	Disposable weight	9168 lbs.
	Weight loaded	19000 lbs.

Performance:

Maximum speed at sea level	168 mph
Average cruising speed	155 mph
Maximum rate of climb at sea level	1550 ft. per min.
Range (with reserve)	115 miles

Source: Ibid., pp. 194-95.

SELECTED BIBLIOGRAPHY

Books

Bridgman, Leonard, ed. Jane's All the World's Aircraft 1949-1950. New York: McGraw-Hill Book Company, 1949.

________. Jane's All the World's Aircraft 1959-1960. New York: McGraw-Hill Book Company, 1960.

________. Jane's All the World's Aircraft 1960-1961. New York: McGraw-Hill Book Company, 1961.

Caves, Richard E. Air Transport and Its Regulators. Cambridge: Harvard University Press, 1962.

Davies, R. E. G. A History of the World's Airlines. London: Oxford University Press, 1964.

Gablehouse, Charles. Helicopters and Autogiros. New York: J. B. Lippincott Company, 1967.

Lee, Ben S., ed. 1959 Aviation Facts and Figures. Aviation Industries Association of America. Washington, D.C.: Lincoln Press, 1959.

Locklin, D. Philip. Economics of Transportation. Homewood, Ill.: Richard D. Irwin, 1966.

McAllister, Gerald J., ed. 1963 Aerospace Facts and Figures. Aerospace Industries Association of America. Los Angeles: Aero Publishers, 1963.

________., ed. 1970 Aerospace Facts and Figures. Aerospace Industries Association of America. New York: McGraw-Hill Book Company, 1970.

Nicholson, Joseph L. Air Transportation Management. New York: John Wiley and Sons, 1951.

Porter, John Sherman, ed. Moody's Transportation Manual, 1959. New York: D. F. Shea, Publisher, 1959.

St. Clair, Frank J., ed. Moody's Transportation Manual, 1966. New York: Robert H. Messner, Publisher, 1966.

Stratford, Alan H. Air Transport Economics in the Supersonic Era. New York: St. Martin's Press, 1967.

Taylor, John W. R., ed. Jane's All the World's Aircraft 1964-1965. New York: McGraw-Hill Book Company, 1965.

Williams, Samuel C. Report on the Helicopter. New York: Brundage Story and Rose, 1956.

Periodicals

Adams, Charles. "Great Lakes Area Granted Helicopter, Feeder Services." Aviation Week, March 11, 1963, pp. 255-56.

Altschul, Seling. "CAB Faces Helicopter Problem." Aviation Week, January 9, 1950, p. 35.

Anderton, David A. "Copter Analysis." Aviation Week, August 7, 1950, pp. 32-38.

________. "Helicopters Facing V/STOL Competition." Aviation Week, March 11, 1963, pp. 255-56.

________. "Military Sparks Helo Growth Survival." Aviation Week, March 12, 1962, pp. 247-53.

Ashlock, James R. "Building Owners Fight Rooftop Heliport." Aviation Week, May 27, 1963, pp. 36-37.

________. "Early Selection of Heliport Sites Urged." Aviation Week, November 26, 1962, p. 43.

________. "Expansion Seen Saving Helicopter Service." Aviation Week, August 24, 1964, pp. 34-35.

________. "Ingestion Causes V-107 Water Landing." Aviation Week, July 23, 1962, p. 33.

________. "New York Airways Fights Survival Battle." Aviation Week, May 13, 1968, pp. 38-39.

________. "NY Airways Tailors Equipment Plans to Expansion of Heliports." Aviation Week, September 17, 1962, p. 41.

________. "Shield Sought for Vertol Engine Intake." Aviation Week, September 3, 1962, pp. 28-29.

________. "Weight Limit Curtails Helicopters at Fair." Aviation Week, May 18, 1964, pp. 40-41.

"Backs Copters for Inter-city Hauls." Aviation Week, May 8, 1950, p. 43.

Balentine, Richard. "Copter Future." Aviation Week, January 11, 1954, pp. 25-28.

Brown, David A. "Helicopters Showing Strong Rise in Corporate Sales." Aviation Week, March 6, 1957, pp. 306-11.

________. "Problems Retard Progress of Helicopters." Aviation Week, October 31, 1966, pp. 134-41.

________. "STOL, Helicopters Vie in Washington Area." Aviation Week, March 24, 1969, pp. 30-31.

"Bunker Ties Subsidy to Copter Success." Aviation Week, November 15, 1954, pp. 104-05.

"CAB Cool to Airline Aid for NY Airways." Aviation Week, July 5, 1968, p. 28.

"CAB Helicopter Subsidy Campaign." Aviation Week, November 30, 1964, p. 29.

"CAB Probes Chicago Helicopter Traffic Dip." Aviation Week, September 17, 1962, p. 49.

"CAB Rulings Reflect Helicopter Policy." Aviation Week, September 9, 1963, p. 38.

Carter, Joseph W. "Pan Am Heliport Foes Plan Court Battle." Aviation Week, January 25, 1964, p. 34.

"Change, New Concepts Set Helicopter Pace." Aviation Week, March 7, 1960, p. 247.

Christian, George L. "Helicopter Mail Rings Bell in Chicago." Aviation Week, January 5, 1953, pp. 56-63.

"Civil Helicopter Total May Double by 1971." Aviation Week, March 7, 1966, p. 290.

"Coast Helicopter Lines Seek Financial Aid." Aviation Week, August 2, 1965, p. 39.

Colbert, Stanley L. "Transport Helicopters Revealed." Aviation Week, November 7, 1949, p. 42.

"Copter Group to See New Turbine." Aviation Week, June 21, 1954, p. 15.

"Eight Airlines Sign Pact with NYA." Aviation Week, October 31, 1955, p. 86.

"Factors in Fatigue Failure Cited." Aviation Week, November 17, 1969, pp. 116-17.

Garrison, Glenn. "Helicopter Design Lags Behind Needs." Aviation Week, March 12, 1956, pp. 258-65.

________. "Jets Boost Chicago Helicopter's Traffic." Aviation Week, May 9, 1960, pp. 43-44.

________. "NY Airways 107 Fleet Keyed to Subsidy." Aviation Week, May 27, 1963, pp. 36-37.

________. "NY Airways Studies Turbine Conversion." Aviation Week, December 8, 1958, p. 47.

________. "NYA Plans Turbine Service." Aviation Week, January 9, 1961, pp. 45-47.

"GE Says Turbines Best for Copters." Aviation Week, November 22, 1954, p. 20.

Gregory, William H. "Los Angeles Airways Expands with S-61's." Aviation Week, April 10, 1961, pp. 43-45.

"Helicopter Aid Conditions Detailed." Aviation Week, December 6, 1965, p. 40.

"Helicopter Airline Files for Bankruptcy." Aviation Week, August 10, 1970, p. 28.

"Helicopter Airline Pushing for Washington-Baltimore." Aviation Week, February 19, 1968, pp. 36-37.

"Helicopter Lines Claim Subsidy Cut Would Bar VTOL Breakthroughs." Aviation Week, July 3, 1961, p. 36.

"Helicopter Lines Face Pressure on Subsidy." Aviation Week, June 19, 1961, p. 41.

"Helicopter Mail Volume Booms." Aviation Week, April 5, 1948, pp. 40-41.

"Helicopter Service Gasps for a New Lift." Business Week, June 1, 1968, pp. 48-51.

"Helicopter Service Recommended for Transportation to Airports." Aviation Week, August 7, 1961, p. 40.

"Heliport Success Based on Convenience." Aviation Week, October 5, 1959, p. 45.

Hoffman, David H. "Sikorsky Rolls Out First Airline S-61." Aviation Week, December 19, 1960, p. 42.

"How to Cut Ground Travel Time." Aviation Week, July 4, 1949.

Jessup, Alpheus. "Sikorsky 35-Passenger Helicopter May Be Ready for Airlines in 1959." Aviation Week, October 31, 1955, pp. 85-86.

"LA Airways Crash." Aviation Week, August 19, 1968, p. 27.

"LAA Plans Include Carrying Passengers." Aviation Week, June 6, 1949, pp. 49-50.

"LAA Readies Passenger Copter Service." Aviation Week, July 23, 1951, pp. 55-56.

"Lack of Heliports Stymies NY Airways." Aviation Week, July 23, 1951, p. 43.

"Los Angeles Airways Costly Strike Ends." Aviation Week, May 11, 1970, p. 27.

McSurely, Alexander. "Copter Firms Reveal Commercial Plans." Aviation Week, November 12, 1951, pp. 13-14.

________. "Helicopter Industry Gets First Big Orders." Aviation Week, October 9, 1950, pp. 12-13.

________. "Reveal Details of Transport Helicopters." Aviation Week, January 2, 1950, pp. 14-16.

Moore, F. Lee. "New York Area to Get Copter Service." Aviation Week, December 17, 1951, pp. 79-82.

"NY Airways Faces Financial Crisis." Aviation Week. April 19, 1965, p. 41.

"NY Airways Reports Loan Arrangements." Aviation Week, June 7, 1965, p. 27.

"NY Airways Revenues Linked to World's Fair, Heavier Schedules." Aviation Week, February 24, 1964, p. 39.

"NY Copter Service Starts This Week." Aviation Week, October 13, 1952, p. 18.

"NY Helicopter Crash Investigation Speeded." Aviation Week, October 21, 1963, pp. 39-40.

"New Congressional Interest Spurs Washington Helicopter Analysis." Aviation Week, August 29, 1966, p. 32.

"New Helicopter Airline Has Early Success." Aviation Week, October 30, 1961, pp. 39-41.

"New Helicopter Airline Organized." Aviation Week, January 16, 1961, p. 43.

Nutall, L. J. "Gas Turbine Improves Performance." Aviation Week, June 27, 1955, pp. 28-33.

O'Lone, Richard G. "Helicopter Carriers Facing Early Crisis." Aviation Week, April 12, 1965, p. 47.

________. "New Management Retrenching at SFO." Aviation Week, February 23, 1970, pp. 39-40.

________. "Traffic Growth Cited in Helicopter Fight." Aviation Week, March 1, 1965, p. 29.

"Operation Cost Cited in Helo Case." Aviation Week, December 18, 1967, p. 33.

"Pan Am Plans to Finance New York Airways Service." Aviation Week, September 8, 1969, p. 24.

"Pan American, TWA Agree to Aid NY Airways in Survival Effort." Aviation Week, June 21, 1965, p. 34.

Plattner, C. M. "Peening Cited in Helo Crash." Aviation Week, January 13, 1969, pp. 97-102.

Pogue, Welch L. "Helicopter's Airpower Role Misunderstood." Aviation Week, February 28, 1949, p. 22.

Reed, William S. "Los Angeles Helicopter Utilization Grows." Aviation Week, March 5, 1962, pp. 57-63.

"Roof Heliport Gives Copter Line a Lift." Business Week, December 25, 1965, pp. 18-20.

Ryan, John E. "Fair Heliport." Aviation Week, June 8, 1968, p. 64.

"S-61's Inspected; Carriers Resume Flights." Aviation Week, August 26, 1968, p. 29.

"S-61L Stimulates LAA Passenger Traffic." Aviation Week, August 27, 1962, pp. 40-43.

"S-62 Service is Begun in San Francisco." Aviation Week, June 26, 1961, pp. 42-43.

"Scheduled Helicopters Continuing Operations." Aviation Week, May 31, 1965, p. 26.

"Scheduled Passenger-Copters For New York?" Aviation Week, November 6, 1950, pp. 45-48.

Schemmer, Ben. "Helicopter Industry Faces Potentially Fatal Squeeze." Armed Forces Journal, June 13, 1970, pp. 14-15.

"Senate Backs Boyd in Approving $4.3 Million Helicopter Subsidy." Aviation Week, August 10, 1964, p. 33.

"Senate Backs Helicopter Subsidies." Aviation Week, November 4, 1963, p. 43.

"Senate Committee Praises Copter Services in Feeder Airlines Report." Aviation Week, April 4, 1955, p. 80.

"Senate Probe of Helicopter Subsidy Due." Aviation Week, July 13, 1964, p. 34.

"Senate Seeks to Extend Subsidy to Additional Helicopter Airlines." Aviation Week, September 10, 1962, p. 39.

"Service at Heliport Facing Suspension." Aviation Week, February 19, 1968, p. 27.

Siekman, Philip. "The Big New Whirl in Helicopters." Fortune, April, 1966, pp. 124-216.

Smyser, Albert E. "Helicopter's Air Power Implications." Aviation Week, February 23, 1948, p. 39.

Stanfield, Robert I. "Helicopter Market Meets Transition Lull." Aviation Week, March 9, 1959, p. 231.

Stone, Irving. "Military Copter Success Spurs Civil Use." Aviation Week, March 15, 1954, p. 143.

"TWA Aid for SFO." Aviation Week, July 20, 1970, p. 30.

"Three NYA Vertols Begin Scheduled Passenger Flights." Aviation Week, June 2, 1958, p. 30.

"Trunks Balk at Aiding Helicopter Carriers." Aviation Week, March 15, 1965, p. 291.

"Trunklines May Discuss Methods to Ease Helicopter Lines' Plight." Aviation Week, March 22, 1965, p. 29.

"Two SFO S-62A's in Accidents." Aviation Week, April 26, 1965, p. 50.

"Vertol Wins Heavy Lift Helicopter." Aviation Week, May 17, 1971, p. 21.

"Volume of Complaints Measures Need for Helicopters." Aviation Week, February 25, 1957, p. 262.

"Wall Street Helicopter Service Is Assured." Aviation Week, March 11, 1968, p. 33.

"Washington Airlines Ends Service." Aviation Week, October 6, 1969, p. 22.

"Washington Helicopter Network to be Studied." Aviation Week, December 9, 1960, p. 29.

Watkins, Harold D. "Airlines to Meet Again on Helicopter Aid." Aviation Week, May 10, 1965, p. 43.

________. "Congressional Debate Endangers Subsidized Helicopter Operations." Aviation Week, May 3, 1965, p. 29.

Wilson, George C. "CAB Defies Congress on Helicopter Aid." Aviation Week, May 11, 1964, pp. 34-35.

Witze, Claude. "Airlines Demand 'Practical' Helicopters." Aviation Week, September 3, 1956, pp. 38-39.

________. "Helicopter Builders Grapple with Costs." Aviation Week, July 5, 1954, pp. 13-14.

"Why Whirlybirds are Taking Off." Business Week, April 20, 1968, pp. 100-20.

"World's Fair Sightseeing Service Delayed." Aviation Week, April 27, 1964, p. 41.

Reports (Published)

Chicago Helicopter Airways. 1956 Annual Report.

Chicago Helicopter Airways. 1957 Annual Report.

Chicago Helicopter Industries, Incorporated. 1970 Annual Report.

Los Angeles Airways. 1961 Annual Report.

New York Airways. 1964 Annual Report.

Report of the Transportation Workshop, 1967, on Air Transportation 1975 and Beyond: A Systems Approach. Bernard A. Schiever and William W. Seifert, co-chairmen. Cambridge, Mass.: The M.I.T. Press, 1968.

San Francisco-Oakland Airlines. 1969 Annual Report.

Reports (Unpublished)

Boeing-Vertol Company. "Feasibility of V/STOL Concepts for Short Haul Transport Aircraft." Unpublished National Aeronautics and Space Administration Contractor Report (CR-743) prepared by Boeing-Vertol, 1967.

________. "Study of Aircraft in Short-haul Transportation Systems." Unpublished National Aeronautics and Space Administration Contractor Report (CR-986) prepared by Boeing-Vertol, 1968.

Diamond, J. "Potential for Pure Helicopters in the Shorthaul Market." Unpublished report by Boeing-Vertol, 1967.

Kimball, Frederic P. "Helicopter Service Requirements of Pennsylvania." Unpublished report presented to the Pennsylvania Aeronautics Commission, 1957.

Lockheed-California Company. "Study on the Feasibility of V/STOL Concept for Shorthaul Transport Aircraft." Unpublished National Aeronautics and Space Administration Contractor Report (CR-902) prepared by Lockheed-California, 1967.

Reizenstein, Howard Hollander. "Economics of Helicopter Operations in Scheduled Local Air Service." Unpublished M.A. dissertation, American University, 1956.

Report on the "Outlook for Vertical-lift Aircraft in Scheduled Commercial Transportation." Prepared for United Aircraft Corporation, the Boeing Company, and the General Electric Company. A. H. Nordling, Project Director. Cambridge, Mass.: United Research Incorporated, 1963.

Stenehjem, George Nelson. "Helicopter Airport Transportation." Unpublished M.S. dissertation, University of Tennessee, 1962.

Vertical Lift Aircraft Council of the Aerospace Industries Association of America. "Government-Industry Relations in the Field of Vertical Lift Aircraft." Unpublished presentation to the Federal Aviation Agency. Washington, D.C., 1963.

________. "The Economies of VTOL Systems." Unpublished report prepared for the Governmental Task Force on Inter-urban Air Transportation. Washington, D.C., 1966.

Public Documents

U.S. Civil Aeronautics Board. Bureau of Accounts and Statistics. Handbook of Airline Statistics, 1963. Washington, D.C.: Government Printing Office, 1963.

________. Bureau of Accounts and Statistics. Handbook of Airline Statistics, 1969. Washington, D.C.: Government Printing Office, 1969.

________. Bureau of Accounts and Statistics. Handbook of Airline Statistics, 1970. Washington, D.C.: Government Printing Office, 1970.

________. Docket Section. Docket 1408, Order Number 420-401(b)-1
Docket 1821, Order Number 420-401(b)-2
Docket 2673, Order Number E-2233
Docket 3800, Order Number E-5506-7

Docket 4077, Order Number E-6206
Docket 8151, Order Number E-10548
Docket 11859, Order Number E-16056
Docket 12029, Order Number E-20214
Docket 12869, Order Number E-19283
Docket 16216, Order Number E-23704
Docket 16721, Order Number E-23050
Docket 17665, Order Number E-24133, 68-11-71, 70-11-85, 71-2-61
Docket 18011, Order Number E-24800
Docket 22420, Order Number 70-80-49
Docket 22566, Order Number (NA)
Docket 22670, Order Number 70-12-146

________. Office of the General Counsel. Aeronautical Statutes and Related Material. Washington, D.C.: Government Printing Office, 1970.

________. "Planning Study STOL-VTOL Air Transportation Systems." Unpublished report prepared by Carl Hintze, Jr., Bureau of Economics, 1970.

U.S. Congress. Senate. Committee on Commerce. Helicopter Air Service Program. Hearings before the Aviation Subcommittee of the Committee on Commerce, Senate, 89th Cong., 1st sess., 1965.

Miscellaneous

Chicago Helicopter Airways. Timetable. April 1, 1962.

"Famous Firsts." 1970 Sikorsky Aircraft Calendar.

Thesis 127815
G8635 Guinn
A study of the commercial helicopter passenger transportation industry.